The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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With this issue is published the Index to Volume XVIII of THE CHEMICAL AGE, *covering the period January 7 to June 30, 1928.*

British Alkali Works

THE annual report on alkali works in England and Wales for 1927 by Dr. Lewis Bailey, the chief inspector, is, as usual, a comprehensive document which covers practically every branch of this great industry. The problem, in the conduct of chemical operations, of avoiding nuisance or, where that is not wholly possible, of reducing it to the narrowest limits, still continues to engage considerable attention. The difficulty usually takes the form of the emission of offensive gases into the air, the drainage of noxious effluents into rivers and streams, and the pollution of atmosphere by dust. That the present position is fairly satisfactory is proved by the fact that extreme action has not been required in any case. At the same time, Dr. Bailey points out that, although it may not be possible to carry on chemical operations entirely without unpleasant effects, whatever can be done should be done and done thoroughly. One practical reason for this course is that where the conditions are improved the quality of work is also improved. In this field some trouble has been caused by the artificial silk works which are now developing so rapidly. Where the viscose process is employed, complaints have been made of the emission of sulphuretted hydrogen and possibly other sulphur compounds. The great height of the chimneys is relied upon in some cases to provide good diffusion of the escaping gases, but even in dilute quantities these gases have an effect on the atmosphere, and the real solution is to get rid of the offensive constituents before their escape into the atmosphere. Much work has been done with this end in view, but the discovery of a satisfactory solution is not regarded as simple.

The number of works registered in 1927 was 1,131, and the number of separate processes inspected 1,844—a decline of 21 in the former and of 23 in the latter. The amount of ammonia products, including synthetic, manufactured in 1927 was 399,587 tons, a considerable advance on the 264,692 tons produced in 1926, and a smaller advance on the 1925 figure of 350,612. Of this total, gasworks were responsible for 147,162 tons, and other works, including synthetic, for 252,425 tons. The total amount of tar distilled in this country was 1,579,218 tons and of pitch produced 438,476 tons. Commenting on the further slight decline in the number of ammonium sulphate works, the report states that by reason of the high cost of manufacture there is now little inducement for gasworks managers to run such plants, except as a means of getting rid of their ammoniacal liquor which in some cases is simply run to waste. "What the gasworks manager needs," in the opinion of the Inspector, "is a method of making a readily saleable ammonia product without the necessity of purchasing an additional intermediate such as sulphuric acid." The displacement of horizontal retorts in many gasworks by vertical retorts is reported to have brought with it two essential differences in the character of the ammoniacal liquor: there is an increased percentage of higher tar acids and the ammoniacal liquor generally obtained is weaker. Not only is the working of the sulphate plant rendered more efficient and economical where the higher strength of the liquor is maintained, but the volume of effluent is reduced by something like 20 per cent. In the sulphuric acid industry, it is reported that sulphur still largely replaces pyrites as raw material.

A point of general importance emphasised in the report is the need of systematic control of chemical operations, a matter to which attention has been drawn for many years. There are, the inspector remarks, even yet some few works where adequate chemical control is wanted. "A process," he remarks, "must be chemically controlled if it is to be conducted efficiently and to the best advantage from the manu-

facturer's standpoint." From the point of view also of possible complaints as to nuisance, chemical control is emphasised as essential, for only by such control can the vagaries of the plant be gauged and nuisance be adequately guarded against.

An incidental but highly interesting fact has been brought to light through a curious instance of damage to a chamber bottom at one works. Leakage of acid began to show itself in two places, and an examination of the lead revealed the fact that there were, at these points on the under side of the lead, circular depressions with a minute pin hole at the extreme depth of the depression. The trouble has been ascertained to be due to the burrowing activities of newly hatched wood wasps (*syrex cyancus*), whose pupæ are found in the wood flooring. The wasp, on emerging, seeks to escape and bores through whatever obstacles it may meet. It says something for the hardiness of this particular insect that it should flourish so well in a chemical environment of this character and that even lead is not impervious to its attacks.

The London Fuel Conference

THE organisers of the World Power Conference on Fuel Problems, to be held at the Imperial Institute, London, on September 24–October 6, are well within the facts in claiming that " the extent of national and international participation in the conference places it in the unique position of being the largest and most representative conference on fuel problems ever held." No fewer than 167 contributions have been accepted, and as each has behind it the weight of some authoritative body, the total contribution will obviously be of an unusually representative character. The programme, indeed, in its wide limits almost reminds one of the British Association's annual meeting, where the most one can do is to select the section of most immediate interest, and regretfully pass the others. The organisers have obviously been conscious of all this, for they have classified the papers in sections, the number of which nearly exhausts the entire English alphabet.

The sections, in some of which there are as many as 19 contributions, are :—A, the coal industry—economic, and general considerations ; B, sampling and testing of solid fuels ; C, coal treatment : cleaning, drying, and briquetting ; D, storage and handling of solid fuels by the user ; E, the oil industry—economic and general considerations ; F, composition, classification, preparation, storage, and handling of liquid fuels ; G, the carbonisation industry—economic and general considerations ; H, composition,classification, preparation, storage and handling of gaseous fuels and of the products of the carbonisation industry ; J, utilisation of fuels for steam generation and the production of electricity ; K, utilisation of fuels, including electricity, for industrial furnace work ; L, utilisation of fuels, including electricity for domestic purposes ; M, pulverised fuel ; N, internal combustion engines ; O, transmission of power ; P, waste heat recovery ; Q, low temperature carbonisation ; R, peat ; S, power alcohol ; T, training of fuel technicians ; V, organisations concerned with the efficient use of fuel in industry ; W, economic possibilities in the better co-ordination of the fuel utilisation ; X, technical data on fuel. It will be seen that the students of fuel problems will require some time to absorb the immense volume of matter that promises to be brought together. We are asked once more to remind any who may be interested in the conference that applications for membership forms should be addressed to the Secretaries, Fuel Conference of 1928, World Power Conference, 36, Kingsway, London, W.C.2.

Methanol Production Costs

THE United States Tariff Commission may shortly undertake an investigation, under the flexible tariff provisions of the Fordney-McCumber Act, into the costs of production of synthetic methanol, urea of fertiliser quality, ammonium sulphate, and ammonium nitrate. On November 27, 1926, the President by proclamation increased the duty on imported methanol from 12c. to 18c. per gallon. At that time the price was 65c. per gallon, but since then the price has dropped to 45c. per gallon owing to the great expansion in the industry. Senator King, who is taking this matter up in the Senate, points out that this drop is more than three times as great as the 6c. increase in duty that was made in 1926, and he suggests that the flexible tariff be made to work the other way, and that the rate be reduced to the full extent permitted under the law. He declares that there is no production of fertiliser urea in the United States, and the production of medicinal urea, with which the former does not compete, is limited to a few hundred tons per year. Importations of fertiliser urea have risen to approximately 1,000,000 lb. a year, it is declared, and the price to the farmer has advanced 35 per cent., which is the rate of duty applied to imports of that commodity. The duty on ammonium sulphate is $5 per ton and on ammonium phosphate $30 per ton.

Institute Activities

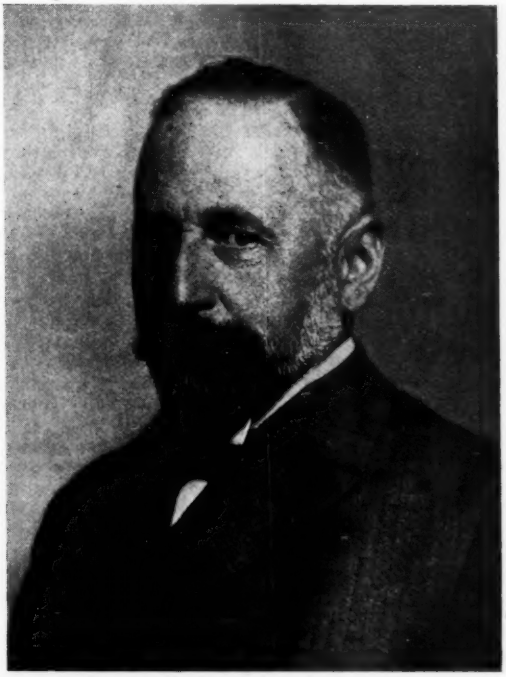
IT will be news to many people that the University of London has acquired a large site, including that occupied by the Institute of Chemistry, and at one time contemplated closing Keppel Street, which the Institute premises front. This would not have been convenient to the Institute, aud it is satisfactory to hear that a friendly agreement has been reached, under which reasonable rights of way, light and air, etc. will be safeguarded when the University decides to close Keppel Street. The Council of the Institute has been considering a circular letter issued by a research association inviting members to submit problems of general interest to the industry and suggesting that problems affecting individual members might be undertaken at an appropriate fee. The attention of the Department of Scientific and Industrial Research has been drawn to the circular, with a hint that associations subsidised from public funds should be careful not to encroach on private practice. In some investigations into the powers of local authorities in connection with the appointment of gas examiners, it has been found that where the local authority fails to appoint, Quarter Sessions has the right to do so on the application of not fewer than five consumers. The Institute considers that this power should be more generally known.

Recent Chemical Appointments and Awards

DR. R. E. SCHMIDT.
The distinguished German dyestuff chemist, recipient of the Perkin Medal of the Society of Dyers and Colourists.

PROFESSOR F. M. ROWE, D.SC., F.I.C.
Recommended for the Dyers' Co.'s Research Medal for the second time.

DR. WALTER CLARK.
Director of the new Research Laboratory to be established by Kodak, Ltd., at Harrow.



PROFESSOR R. WILLSTATTER.
Nobel Prizeman in Chemistry, selected a Foreign Member of the Royal Society.

Annual Report on English Alkali Works

General Standard of Efficiency Maintained

The annual report on alkali, etc., works for 1927 has just been published (H.M. Stationery Office, 1s. 3d., pp. 41). The report on England and Wales, written by Dr. T. Lewis Bailey, the Chief Inspector, is given below. A note is given in the report of the retirement on superannuation of Mr. F. Napier Sutton, F.I.C., one of the Inspectors, who was connected with the inspection service for 35 years. Mr. W. A. Damon, B.Sc., F.I.C., has been appointed in his place.

THE number of works registered in 1927 was 1,131, which entailed the inspection of 1,844 separate processes; there was thus a reduction of 21 in the number of works, and of 23 in the number of processes as compared with the previous year. The number of visits of inspection by the District Inspectors to registered works during the year was 3,859, in the course of which 2,311 quantitative estimations of the noxious constituents of chimney and other gases, escaping from the processes in operation, were made.

The general tone of efficiency in the works is maintained, and it has not been found necessary to take extreme action in any case, although instances have occurred where it has been necessary to comment somewhat strongly upon a lack of proper supervision in dealing with noxious or offensive gases.

It may not be possible in all cases to ensure that no smell whatever shall come from a works carrying on chemical operations, but whatever can be done should be done, and done thoroughly. It is surely a fact that where the conditions under which the operations are carried on are improved the quality of the work is also improved.

Complaints

The number of complaints received during the past year, alleging nuisance from works operating chemical processes, was 25. Of these, one related to nuisance alleged to be due to the drainage from an old alkali waste deposit, three concerned emission of acid fumes from sulphuric acid works, two alleged nuisance from tar works; other registrable processes were blamed as follows: Ammonia, three; sulphide works, one; bisulphite works, one; cement works, one; smelting works, one; Venetian red works, one; zinc works, one.

During the year an Order (already noted in this journal) was prepared under the powers of Section 4 of the Public Health (Smoke Abatement) Act, 1926, for extending the list of noxious gases and the list of scheduled operations to which the Alkali, etc., Works Regulation Act shall apply. After a public inquiry, at which no objections were raised, it has been laid before Parliament.

Artificial Silk Works

One new manufacture, which has been receiving some attention during the year under review, is that of artificial silk. It has had a somewhat rapid growth in recent years, and complaints have been made from various quarters owing to the emission of sulphuretted hydrogen and possibly other sulphur compounds from works employing the viscose process. The sulphuretted hydrogen content of the gases escaping from the chimneys of these works may not seem high (it is a very small fraction of 1 per cent.), but, when one considers that the presence of this gas can be detected by smell when present to the extent of one part only in a million of air, and that the volume of contaminated air emitted is very large, it is manifest that there is a possibility of, at any rate, an unsavoury character of the atmosphere in the neighbourhood of these works.

In some instances chimneys over 300 ft. in height have been built in order to provide good diffusion of the escaping gases before they could reach the lower levels, but it is realised that the ideal way out of the difficulty is to get rid of the offensive constituents before emission to atmosphere. Much work has been done with this end in view, and much still remains to be done, but the extreme dilution and the large volume of air to be dealt with make the finding of a satisfactory solution of the problem by no means simple.

There is still little wet copper extraction done in the country. Whether operations will increase in the near future will depend largely on the relative claims of pyrites and sulphur as raw product in the manufacture of sulphuric acid.

The Leblanc Process

The Leblanc process for the manufacture of saltcake and hydrochloric acid continues in a steady condition; there is still further attention being paid to details by the introduction of the newer types of condensing apparatus and the addition of fan draught. These plants may be said to be under even better control than formerly.

Two local authorities, on whose borders is situated an alkali works, made complaints relating to periodical emission of sulphuretted hydrogen, particularly in wet weather. The initial source of trouble was an old alkali waste heap, the drainage from which was becoming mixed with drainage from the works. Means were adopted for neutralising the works drainage, but these were inefficient. The matter was taken up strongly with the owner of the works, and as a result continuous neutralisation of any acid effluent from the works by means of waste caustic soda solution was resorted to. This has had a good effect.

Where water courses receive alkali waste drainage, it behoves the owners of works of all kinds, whether chemical or not, to see to it that no effluent containing acid or other substance capable of liberating sulphuretted hydrogen from alkali waste or from drainage therefrom shall be run to these water courses without efficient prior treatment. The inevitable result of a disregard of this may be the evolution of sulphuretted hydrogen from the water course, a condition of things which led to the inclusion of special provisions in the Alkali, etc., Works Regulation Act, 1906, section 3 to 5.

Cement Works

Most of these works have been fully employed throughout the year. The number of rotary kilns is increasing, this type continuing gradually to replace the older forms; moreover, it would appear that finality has not yet been reached in the length of these kilns, which, in some instances, is now approximating 300 ft.

Local nuisance has been caused in certain localities, due to excessive dust discharge from the works chimney by reason of the failure to catch fine dust produced by a modification of former kiln practice. The possibility of the escape of so much dust was not at first realised; however, steps were taken: (*a*) to reduce, as far as possible, the production of this fine dust; and (*b*) to prevent undue accumulation of it in the dust collecting chambers by continuously returning it to the system. Nuisance is thus obviated and the output of the plant is increased.

Smelting Works

Further advance is to be chronicled in the treatment of the gases produced in the calcination of zinc blende in South Wales; sulphuric acid plant has been installed at another large works carrying on this operation.

Whereas until comparatively recent years the sulphurous gases from this operation were emitted to atmosphere without treatment, they are now almost generally transformed into sulphuric acid, which is recovered. This has been attained only after very persistent work on the part of the companies concerned; extensive research has been necessary, and this, together with the work of general installation, has been done in such a way that a word of congratulation may not be out of place. It is anticipated that it will not be very long before the whole of these gases are similarly dealt with.

Sulphuric Acid Works

Sulphur still largely replaces pyrites as raw product. The operation of the lead chamber process is affected to an important degree by two main factors: (*a*) the large amount of acid which is being recovered by contact plants in connection with the calcination of zinc blende concentrates; (*b*) the continued unsatisfactory state of the superphosphate trade.

The character of the lead chamber process has been for a considerable period in a state of gradual modification; the newer plants erected have, in general, been on the line of intensive action, and it is becoming now a matter of combining intensive action in new installation with increased size

of units, with a view to attaining the most economical working conditions.

The circulation of acid in chambers by means of such spraying devices as the turbo-disperser has been receiving considerable attention abroad of late, but its introduction into this country is delayed. The use of sprayed acid in rectangular chambers has much to be said for it, but whether the application of the principle is suitable for any particular class of plant is a question which must be settled by a consideration of all the circumstances. In this connection one must mention such mechanical devices as the Schmiedel box ; these have received quite a lot of attention in recent years. Too much seems to have been expected of them at the outset, and it has taken a considerable time to ascertain definitely their limitations.

Sulphuric acid plants have been worked satisfactorily throughout the country. One still occasionally comes across instances of sudden destruction of the lead work of a Glover tower by overheating ; these appear to be due usually to a temporary cessation of the acid supply—suggesting inefficient supervision. Such occurrences may have far-reaching consequences. For instance, at one works recently the flint packing in the middle of a Glover tower, whose lead work had been partially destroyed by overheating, was found on examination to be so far disintegrated that the natural channels were blocked, all the hot gases having thus been diverted to the sides of the tower. So far as could be ascertained, it appeared that there had been cessation of the flow of acid to the tower for some hours, and that when cold acid was subsequently suddenly run to the tower disintegration of the hot packing took place.

Curious Action of Wood Wasps

Mr. Sutton calls attention to a curious instance of damage to a chamber bottom at one work. Leakage of acid began to show itself in two places, and examination of the lead revealed the fact that there were at these points on the under side of the lead circular depressions, several millimetres in diameter, with a minute pinhole at the extreme depth of the depression. Similar instances are not unknown. The trouble is due to the burrowing activities of newly hatched wood wasps (*Syrex cyaneus*), whose pupæ are found in the wood flooring ; the wasp, on emerging, seeks to escape, and bores through whatever obstacles it may meet. The larva of a somewhat similar insect, the bacon beetle, is a pest in manure works, where bones, hides, etc., are stored ; it burrows into the woodwork of the buildings and is apt to cause serious structural trouble in consequence.

Complaint of excessive emission of acid gases from one sulphuric acid works was reported by the local authority. The plant (an adjunct to a superphosphate plant) had just undergone its periodical repair and manufacture was being recommenced. The weather had been unusually wet, new brickwork and flues had apparently not sufficiently dried out when the kiln fires were started, and by an error of judgment the charging of pyrites was commenced too soon. Draught conditions were thus not satisfactory, and for a time there was a heavy low-level escape of acid gases, which caused serious annoyance in the neighbourhood, together with damage to gardens and a nearby park. The case was carefully considered, and it was not deemed to be one in which prosecution should be instituted. The general record of the works in question is a good one. The occurrence was due rather to a series of unfortunate circumstances than to negligence.

Importance of Adequate Chemical Control

While on the subject of nuisance, it may be as well to refer to one point to which it should not be necessary to advert after so many years of experience by the acid trade—the point is that of systematic chemical control of operations. There are even yet some few works where adequate chemical control is wanting. A chemical process must be chemically controlled, if it is to be conducted efficiently, and to the best advantage from the manufacturer's standpoint ; from a possible complaint point of view, too, chemical control is essential—only by such control can the vagaries of the plant be gauged and nuisance be adequately guarded against.

The water scrubbing of Gay Lussac tower exit gases continues to attract attention. It does not appear to be fully realised that, beyond the oxidation of SO_2 (at the expense of nitrous acid, which is reduced beyond nitric oxide), there is a possibility of recovering nitric acid when the oxides of nitrogen are in excess of what is actually needed for oxidising the SO_2, although this was pointed out in the Scottish section of the 62nd Annual Report, 1925, p. 28, and again in the account of our own experiments in the 63rd Annual Report, 1926, p. 16, Experiment 1. A word of warning in this connection may not be out of place : owing to the presence of nitric acid in the liquor produced in the scrubber, steps should be taken to protect the leadwork of the scrubber as far as possible from its corrosive action.

If nitre recovery *only* is aimed at, without any consideration of an improvement of exit due to recovery of SO_2 as sulphuric acid with consequent reduction of residual oxides of nitrogen to N_2O, water scrubbing may offer no advantage over additional scrubbing with acid of appropriate strength, since above 14° Tw. the reduction of NO to N_2O is inhibited, and this would be favourable to recovery of nitre.

Sulphuric Acid (Class II) Works

There is comparatively little concentration of acid done at the present time. The amount of contact acid made nowadays provides a way of producing the higher strengths of acid without recourse to concentration of lower grades. Where concentration plants have been operated, they have in general been controlled satisfactorily.

Complaint was made, however, against one such works ; the acidity of the exit gases was below the statutory limit, but, even so, a certain amount of inconvenience was caused to inhabitants in the immediate neighbourhood. Representations were made to the owner of the works, and by a further scrubbing of the exit gases considerable improvement has been effected.

Serious objection was taken to the unsatisfactory state of the concentrating plant at another works. Exits here were not of excessive acidity, but the condition of the general body of the plant was such that low-level escapes were repeatedly calling for comment. Repairs had very temporary effect only. This plant is now out of action altogether.

Considerable advance has been made in the operation of contact plant and their number has increased. The introduction of soda wash towers for the final gases, where found desirable, has proved entirely satisfactory. This constitutes a feasible method of producing a valuable material as a by-product, and it has at the same time had the effect of bringing down the acidities of the exits from the contact plants, where the method is adopted, to a reasonable point, with consequent removal of what was at one time a serious source of atmospheric pollution.

Chemical Manure Works

These works have been as active as the still-prevailing disadvantageous conditions would permit, and a considerable amount of superphosphate has been produced, particularly at the larger works. The gases escaping from the process have been well treated ; the scrubbing has been in practically all instances very satisfactory. At two works, however, altered conditions gave results which for a time were by no means all that could be desired. Those responsible for the conduct of operations were not slow to accede to the requests of the inspectors of the districts in which the works are situated, and normal results are now being obtained.

Sulphate of Ammonia and Gas Liquor Works

There is a further slight decline in the number of sulphate of ammonia works. By reason of the high cost of manufacture there is now little inducement for gas works managers to run such plants, except as a means of getting rid of their ammoniacal liquor. It is not heartening to come across instances of this liquor being run to waste, as one has seen it so disposed of in places where the situation of the works admits of this being done without nuisance. What the gasworks manager needs is a method of making a readily saleable ammonia product without the necessity of purchasing an additional intermediate such as sulphuric acid.

There is no serious adverse comment to make this year as to the way in which operations have been conducted at these works.

Horizontal and Vertical Gas Retorts

The displacement of horizontal retorts in many gasworks by vertical retorts for the manufacture of coal gas may be said to have brought with it two essential differences in the character of the ammoniacal liquor : there is an increased percentage of higher tar acids and the ammoniacal liquor

generally obtained is weaker, as regards ammonia, by reason of the relatively large proportion of undecomposed steam passing forward, where steaming of the retorts is practised.

The former has naturally caused attention to be drawn to the methods of extracting tar from the crude gas, and it would appear to be most desirable that this should be affected as completely as possible at an early stage, with a view to reducing contamination of the ammoniacal liquor by higher tar acids and other constituents, which is found to be excessive when there is undue contact of liquor with tar in storage wells or in other parts of the plant. Treatment of the crude gas by means of liquor sprays has been inaugurated at some works, the effect of dynamic treatment is being investigated and particularly in other countries work has been carried out on the line of electrostatic precipitation.

The weakness of the ammoniacal liquor in the case of vertical retort plants is prejudicial in the subsequent manufacture of sulphate of ammonia. One obvious line of action, which has now been adopted with success at several works, is to cut out the final water scrubbing that is usually employed for completing the extraction of the ammonia from coal gas; a thorough cooling of the crude gas by means of water-tube condensers, followed by a scrubbing with weak liquor from the earlier section of these condensers (cooled before use), gives a satisfactorily strong liquor and need not leave in the gas more than, say, 30 grains of ammonia per 100 c. ft. of gas; this is dealt with in a sulphuric acid catch, the incompletely neutralised liquor from which can go to the saturator of the sulphate plant. Not only is the working of the sulphate plant rendered more efficient and economical by reason of the higher strength of the ammoniacal liquor obtained, but the volume of effluent is reduced by something like 20 per cent.

Experience has shown that no subsequent trouble need be caused at the purifiers by the use of such method, provided that provision be made to by-pass a little ammonia to the purifiers as occasion may require.

Disposal of Ammonia Effluent

Managers of works where trouble is experienced in the disposal of ammonia plant effluent will be well advised to consider the question of running away the effluent continuously throughout the year at a properly regulated rate, instead of running it intermittently, direct from the ammonia plant, at such times as this plant is operating. It is not perhaps sufficiently realised that sudden changes of the oxygen absorbing value of a sewage may have an even greater detrimental effect on the bacteria at the sewage works than has a fairly strong sewage whose oxygen absorbing value remains constant.

By installing storage tanks for the effluent it is a comparatively simple matter to run off continuously in such a way that there shall be no great fluctuation in the character of the general sewage received at the sewage treatment works. It may be necessary, in addition, so to work the ammonia plant that periods of idleness of this plant are of much shorter duration than has been the custom. Such means have actually been adopted at a number of gas works, with the result that difficulties between the gasworks and the sewage authorities have been overcome.

Chlorine Works

The manufacture and use of liquid chlorine continues to extend; three more works were registered for chlorine during the past year than in the previous year. Its use is finding more and more application in the manufacture of both inorganic and organic compounds; a large amount is being used also in connection with bleaching operations in the paper and similar trades.

Bleaching powder manufacture has advanced a further stage by the introduction of modifications which admit of the production of a "stabilised" material. Hitherto much inconvenience and loss has been caused by bleaching powder deteriorating very rapidly on storage, especially in warm climates; the newer product does not possess this drawback to any great extent.

Muriatic Acid Works

The synthetic manufacture of acid continues in an active condition; operations are excellently carried out and supervision has been all that could be desired.

Fibre separation works have operated practically without offence; complaint was made against one of them, but it was found to relate to dust nuisance caused by the shaking of the rags and not to the chemical operation for which these works are registered. Tinplate flux works and salt works have given no cause for adverse comment.

Sulphide Works

Works dealing with large amounts of sulphuretted hydrogen, or with the treatment of sulphides from which sulphuretted hydrogen is evolved in the course of manufacturing operations, demand the greatest care in the supervision of details. Only one complaint was received during the year, and this was of a minor character; the smell of sulphuretted hydrogen complained of could not be traced to the works from which it was alleged to have come.

Nitrate of Iron Works

At one works it was found that manufacture of nitrate of iron had been commenced on a small scale in a very crude manner, and it was necessary to go into the matter in some detail before satisfactory plant was arranged for. Oxides of nitrogen, evolved in chemical processes, must receive treatment for their absorption. This has been insisted on in connection with nitrate of iron works for many years. Such gases are of a highly noxious character.

Venetian Red Works

One of these works, which has given some trouble in the past, is now operating satisfactorily. Acid gases given off in the furnace process can be absorbed quite well in towers packed with limestone and fed with water, but managers should be more particular to inspect the towers regularly with a view to satisfying themselves that there is always a sufficiency of limestone present.

Bisulphite Works

The number of these works, in spite of the restrictions on the use of preservatives in food, has increased from 36 to 40. On the whole these works have been carefully conducted; there was, however, serious complaint regarding occasional smells of sulphurous acid from one bisulphite plant at a works which is closely surrounded by dwelling houses. The plant used was of somewhat unusual type and, particularly in hot weather, difficulty was found in getting complete absorption when full-strength liquor was required. The matter was taken up by the district inspector and modifications were introduced whereby it is found possible to deal satisfactorily with any excess gas hitherto passing from the process.

Tar Works

Works distilling large quantities of tar are very apt to be looked upon with suspicion in any residential neighbourhood. Managers must use every care to ensure that everything possible is done to obviate nuisance not only from the tail gases of distillation and from pitch fumes, but from all sources. Pyridine has often been a subject of complaint in the past; it is hoped that, with the inclusion of pyridine in the schedule of works, nuisance from this source will largely disappear.

Strong complaint was recently made against one tar works, attention being drawn to the fact that there was a considerable deposit of tarry matter on neighbouring properties. The origin of this deposit proved to be an exceedingly small perforation in the top of the tar delivery main to the storage tanks.

Ammonia Products Manufactured in 1927.

Expressed as Sulphate (25¾ per cent NH_3—Tons.

From Liquor Produced in—	1927.	1926.	1925.
Gasworks	147,162	132,477	148,945
Other Works (including Coke Ovens, Ironworks, Producer-gas, Synthetic, etc.)	252,425	132,215	201,667
Total	399,587	264,692	350,612

Note.—Of the total quantity of ammonia products, the equivalent of 36,667 tons was manufactured as concentrated ammoniacal liquor; the balance of 362,920 tons consisted of other ammonia products (sulphate, chloride, nitrate, etc.).

Tar Products Manufactured in 1927.

	Gas and Coke Oven Works. Tons.	Other Works. Tons.
Tar Distilled	1,567,072	12,146
Pitch Produced	432,653	5,823

Lead as a Constructional Material for Chemical Plant

By S. J. Tungay

In view of the recent publication of Standard Specifications for Lead and Regulus Metal by the British Engineering Standards Association, this article by Mr. S. J. Tungay, whose views on the subject command respect, will be read with interest.

THERE has been a tendency during the last few years for chemists, metallurgists, and engineers to pursue more deeply investigations into the nature of metals necessary for plant which is required to withstand corrosion from acids and chemicals. Lead as a medium for the construction of chemical plant has been in use from the very earliest days of chemical practice, and particularly since the early part of the seventeenth century. Whilst it is a metal possessing certain disadvantages, these are greatly overweighed by the excellent properties possessed by it. Indeed, the enormous amount of valuable service which has been obtained from the application of a metal possessing such weak mechanical properties as lead is remarkable.

Lead was one of the first known metals, and was used extensively by the Phœnicians; and notwithstanding that pessimistic views have, to some extent, been entertained by American investigators to the effect that lead may soon be considered a luxury unless new deposits are located, owing to the heavy drain upon the world's resources of this metal by the chemical and the electrical industrialists (both of which are very large consumers of lead), yet it seems unlikely that the time is very rapidly approaching when the chemical engineer will be called upon to furnish a substitute for this element of which Nature has provided us with vast resources.

In considering lead as a constructional material for chemical plant, the mind of the chemical engineer immediately turns to its application in the manufacture of sulphuric acid plant and its wide application for use when dealing with sulphuric acid; this being unquestionably its most extensive application in chemistry.

Valuable Properties of Lead

The peculiar softness, plasticity, and ductility of lead, apart from its low tensile strength, render the metal an exceptional material for the construction of chemical plant; further advantages are the great ease with which it may be fused or melted and cast at comparatively low temperatures, or joined by fusing parts together, or modelled, formed, or worked cold by gently hammering, with greater facility than perhaps any other common metal. These valuable factors render lead an exceptional and unique metal for constructional purposes in connection with chemical plant.

Add to the virtues just enumerated the fact that it is a metal easily obtained in a high degree of purity, that it has an exceptionally reasonable first cost, that it yields an old metal or scrap value almost equal to the cost of new metal, that it occurs in sufficient abundance in most industrial countries to meet the needs of the industrialist, and we realise that what we have often termed a " base " metal is a " noble " metal in the services of chemical engineering.

It was stated above that as an acid-resisting metal, lead stands unique in many respects, having peculiar and outstanding advantages not possessed by other pure metals of reasonable cost. There is no question that its reasonable cost and great purity are very largely responsible for the fact that it has been for many years the most widely applied metal for withstanding chemical action and corrosion, and that it still remains practically the only metal which is suitable for building the large chambers and towers required for the manufacture of vitriol by the well-known and still extensively used chamber process. Excellent as this material is, its excellences are, to a great extent, limited to its application for resisting sulphuric acid and liquids containing the latter; but this application to the chemical industry is one that is enormously widespread.

Behaviour towards Very Concentrated Sulphuric Acid

There are comparatively few other acids for which lead is of any great service; in the ordinary way it is a perfect resistant to cold sulphuric acid, even in a dilute condition; and it will withstand the acid either hot or cold. Singularly, however, when we desire to handle sulphuric acid of strength exceeding 80 per cent., corrosion of the lead is soon apparent, particularly in cases where the acid is hot, whilst with oleum or fuming sulphuric acid, lead breaks down altogether, and is rapidly corroded away; hence, with concentrated forms of sulphuric acid, we are forced to resort to other materials for construction.

From its very extensive application as a resistant to sulphuric acid and liquids containing the latter, has arisen the term " chemical lead." This lead is usually a refined lead as produced by lead manufacturers, of 99.99 per cent. purity. The author much prefers to term this metal " acid-resisting lead," since this nomenclature is more accurate. " Chemical lead " is not produced by a chemical process or synthetically in the same way as are " chemical colours " or " chemical silk." It is not a metal made of chemicals, but for resisting them. Since our acid-resisting steels and acid-resisting irons are never termed " chemical steel " or " chemical iron," there seems no adequate reason why we should call acid-resisting lead " chemical lead."

Question of the Purity of the Metal

It has already been mentioned that a pure metal for acid resistance is quite easily procurable, and in fact the purity of the lead used is absolutely essential where it is required to resist corrosion from sulphuric acid. On this question of purity there has been much discussion among chemists and metallurgists. Reference to some of the earlier works on the subject shows us that there has been much uncertainty on the question of the purity of acid-resisting lead or even as to the degree of purity that was absolutely necessary. In an earlier work we are told that " the lead preferred for the construction of sulphuric acid chambers is that obtained by re-melting old lead, which is hardened by a small amount of antimony." The experiments of Johnson and Calvert (Comptes Rendus, 56,401), of Hasenclever (Waj. J., 1872, 239), and of Bauer (Waj. J., 1875, 364), endeavoured to show that ordinary lead resists the action of sulphuric acid more effectively than pure lead.

We have, however, advanced considerably in the study of lead for chemical plant since these statements were promulgated; but the author is convinced that we have not yet advanced sufficiently, and that considerable application on the part of chemists and metallurgists is still called for in the study of acid-resisting lead.

C. E. Barrs has carried out some very valuable work dealing with the influence of impurities in lead and its behaviour when heated with concentrated sulphuric acid (J.S.C.I., December, 1919). This work was especially undertaken in order that it might prove of assistance to those interested in the use of lead for chemical purposes, and in particular to manufacturers of sulphuric acid. According to this authority, two different brands of lead furnished as acid-resisting lead showed very different power of resistance when subjected to the action of concentrated sulphuric acid.

Two samples, marked A and B, respectively, were tested, and gave the following analysis :—

	A Per Cent.	B Per Cent.
Copper	0·002	0·021
Bismuth	Trace	0·005
Silver	0·001	0·002
Arsenic	0·001	Trace
Antimony	0·009	0·003
Iron	0·005	0·004
Manganese	Trace	0·001
Zinc	0·001	0·001
Lead (by difference)	99·981	99·963

The lead A was rapidly attacked by the acid at 250° C., while B resisted the attack until a temperature of 296° C. was attained. This tends to show that the lead having the higher percentage of impurity in the form of copper withstood sulphuric acid the better. The same authority made a further series of tests on chemical lead from different sources, which again showed a greater resistance with copper as the predominating impurity when subjected to a test with hot sulphuric acid.

Two further typical examples, C and D given by Barrs, are stated below :—

	C Per Cent.	D Per Cent.
Copper	0·017	0·017
Bismuth	0·004	0·001
Silver	0·002	0·002
Arsenic	Trace	0·001
Antimony	Trace	0·301
Iron	0·003	0·003
Manganese	0·001	0·001
Zinc	0·001	Trace
Lead (by difference)	99·972	99·674
Attacked by sulphuric acid (*i.e.*, action vigorous) at	300° C.	260° C.

Throughout the whole of the tests it was clearly proved that increased purity of the lead rendered it more resistant to attack by acid. The only slight impurity which might perhaps be preferred from this experiment would be a small percentage of copper, say from 0·02 to 0·05 per cent.

D. W. Jones, in a paper read at Newcastle in 1920 (*J.S.C.I.*, 1920, 221), dealt with the methods of testing chemical sheet lead and the variations in the results obtained from different known qualities of chemical lead. This authority undertook a very considerable number of tests on chemical lead throughout the war period, when large quantities were being used for the production of acid for war material ; and he recommends the following methods as the customary ones adopted in order to determine the quality of chemical lead, pointing out that it is usual to make examinations by all or any of these methods :—

(1) Heat in 96 per cent. sulphuric acid up to 292° C. in five minutes, cool to 100° C. and observe loss in weight.

(2) Heat in 91 to 92 per cent. nitric acid. No appreciable action should occur in fifteen minutes.

(3) Heat in a mixture of 40 per cent. of nitric acid, 52 per cent. of sulphuric acid, and 8 per cent. of water. No appreciable action should take place between 93° and 109° C.

(4) Heat a filed surface in a mixture of 1 vol. of hydrochloric acid, sp. gr. 1·14, 2 vols. of nitric acid, sp. gr. 1·50, and 3 vols. of water. The time required for spots of lead chloride to appear, and the time at which vigorous action takes place after boiling are noted.

(5) Heat in concentrated sulphuric acid and observe the temperatures at which bubbles of gas are first evolved and at which the lead decomposes.

Jones also emphasises that purity of the lead is essential, but points out that in certain makes of lead the slight proportion of antimony present, which would of itself be deleterious as an ingredient to the chemical lead, is nullified in some cases by the action of a slight percentage of copper present, which has the effect of counteracting the influence of antimony in small quantities ; in fact, he states that with 0·02 to 0·03 per cent. of antimony and copper there seems to be a rise in the temperature of initial attack.

Very useful information is afforded in the way of practical tests with different chemical leads for sulpuric acid chambers by exposing test pieces of sheet lead, previously measured and weighed, to the exit gases of a No. 1 sulphuric acid chamber, and noting the loss per unit of area over a given period.

Some controversy as to the relative values of lead desilverised by the Pattinsonian and the Parkes method still exists. Both are used by chemical manufacturers for chemical plant equipment. Both processes have much to recommend them, and both produce lead of a high degree of purity.

Possibly points worthy of more consideration are to be found in the mechanical methods adopted by the manufacturers for maniplulating and rolling lead sheet, such as the speed of rolling, the temperature, and other details of manufacture which must necessarily influence the ultimate quality of lead sheets and pipes, while in no way affecting the composition of the metal.

An otherwise good quality of lead has even been found to contain inclusions of lead oxide, which although not evident upon analysis, caused the lead sheets to develop porosity when in use with sulphuric acid.

One body of competent authorities on the question of chemical lead stipulates that the lead must be of 99·99 per cent. purity. The impurities forming the remaining 0·01 per cent. of metal will usually consist of very slight traces of copper, silver, antimony, zinc, iron and possibly also remote traces of arsenic, nickel, bismuth and tin. A specimen analysis of good chemical lead has been shown to give the following results :—

Lead	99·986 Per Cent.
Copper	0·005 ,, ,,
Antimony	0·002 ,, ,,
Iron	0·004 ,, ,,
Zinc	0·002 ,, ,,
Silver	0·001 ,, ,,

Traces of arsenic, nickel and tin were also present. Any appreciable amount of other impurity in the metal will give rise to very rapid deterioration. Chemical lead produced by different lead refiners will vary slightly from time to time, but the importance of ascertaining its purity is very essential.

The corrosion of lead varies considerably, not only with the varying strength and the temperature of the acid with which it is in contact, but also with the velocity of the acid or solution across the surface of the metal. Figures 1, 2 and 3 serve to show the influence of velocity and temperature on corrosion.

Causes of Failure

The causes of failure of lead, and its corrosion when in use with acid, are often very elusive and obscure. The method adopted for supporting the lead work of chambers has been known to accelerate corrosion owing to the continuous mechanical strains set up as a result of creeping and stretching of the metal. This in itself may be sufficient to nullify the protective action of the surface film which is so essential for resisting the inroads of corrosion. The writer had experience, some four years ago, of some lead cracker pipes in a large sulphate of ammonia saturator. These were ½ in. thick when made, and rapidly corroded away until, after about seven months working, the lead fractured and was found in places to have only the thickness of Paper.

It was difficult to ascertain the cause of such continuous and rapid corrosion. When replaced by new pipes, a similar failure was reported. The lead was analysed in both instances (it had been purchased as " chemical lead " from manufacturers of high repute, and was found after failure to show a lead content of 99·99 per cent. and to be practically free from zinc). Ultimately it was ascertained that mechanical strains and continued sagging of the metal were undoubted causes of failure ; for when the pipes were finally supported in such a manner as to prevent any possibility of creeping or deformation during the operation of the plant, no unreasonable amount of corrosion was experienced.

In considering the corrosion of lead, the following factors have to be borne in mind by chemical engineers :—

1. The thickness of the protective corroded film on the surface of metal depends upon the velocity of flow of the acid or corrosive liquid ;

2. Corrosion is accelerated by surface strain, mechanical strain, or stretching of the metal ;

3. The corrosion varies greatly according to the concentration of acid or corrosive liquid ;

4. The peculiar effect of increase of corrosion rate on metal in acid solution by the addition of a salt of the metal to the acid. (This may doubtless be explained by the additional solubility produced by surface film of a higher concentration of metal salt.)

5. Impurities have a great effect on corrosion. The addition of common salt to sulphuric acid solution, with the formation of hydrochloric acid, produces a far greater corrosion of lead, while the addition of a small amount of sodium sulphate to acetic acid decreases the rate of lead corrosion.

Other Uses of Lead

It must not, however, be thought that the satisfactory application of lead is restricted only to sulphuric acid. Acid-resisting lead has a very widespread application in the construction of concentration plant for the concentration of sulphuric acid and phosphoric acid, also the construction of plant for sulphonation and chlorination processes. In addition to sulphuric acid chambers and towers constructed almost wholly of lead, large quantities of acid-resisting lead are used for the construction of sulphate of ammonia plant, including the heavy lead saturators used in this process, as well as pipe work, drainers, and other accessories for sulphate of ammonia manufacture. No metal has been found so satis-

factory as lead, on an industrial scale, as a medium for the construction of this plant.

Again, in the explosives industries, nitroglycerine saturators, together with almost the entire equipment of nitroglycerine plant, including coils, washers, coolers, tanks and separators, are usually constructed throughout of acid-resisting lead. For use with mixed acid, the acid-resisting lead has been found to be highly serviceable, providing the nitric acid content is not excessive. For use in the preparation of many of the dyestuff intermediates, acid-resisting lead has been found very serviceable; notwithstanding the fact that the corrosion is perhaps greater than when used with sulphuric acid alone, lead still remains the most serviceable and economical metal for use in contact with these compounds.

Lead Coatings and Linings

In the application of acid-resisting lead to vessels required to sustain pressure, a protective internal lining of lead could easily be arranged for chemical plant on walls of iron, steel or copper, or other stronger metal; the latter can be either lined with lead sheet or a perfect homogeneous surface of lead could be arranged to cover the entire surfaces.

The question of coating or covering other metals with lead for the purposes of chemical plant requirements is one which has received much attention both in Europe and America.

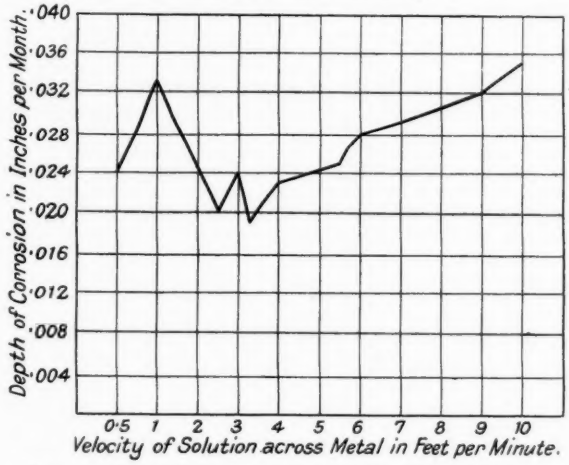


FIG. 1.—VELOCITY TESTS WITH 20% HCl ON LEAD.

Several Continental firms maintain that they possess either secret processes and methods, or have specially trained and skilled operatives enabling them to produce homogeneously lead-lined steel vessels or parts, the lining or coating of which when finished is in such a condition that the lead and steel surfaces are perfectly united and separable only by chiselling or melting the lead.

Of all the methods of lead coating, the homogeneous lining is unquestionably the best, providing it is satisfactorily accomplished. Other methods which have been practised are tinning the surfaces of metal and then soldering on lead sheet; electro-deposition of lead direct on to metal; spraying metal surfaces with molten lead by the "Schoop" or spray process. Each of these methods has its applications, but an absolutely homogeneous coating or lining must be provided for such construction as is required to withstand the action of pressure and vacuum.

The "Zeitler" method adopted in America is described as a wire net or gauze tinned and riveted to tinned steel plate by means of copper rivets. The lead lining is then cast on to this screen, which latter forms a good anchorage for the lead, whilst the tinned surfaces ensure good contact between both lead and steel. Numerous methods have been advanced from time to time for coating parts with lead by painting or coating with lead particles suspended in solution. These paints or coatings for chemical lead may possess some advantage as a resistance from corrosion by fumes or occasional splashes of acid; but it is obvious that their mechanical resistance cannot be great.

In a paper by Olsen-Wuell and Holly, read at the Brooklyn Polytechnic Institute last year, dealing with "The Corrosive effect of nitric and hydrochloric acid on lead containing small amounts of copper and antimony," it was found in general that pure lead was more satisfactory from the point of view of acid resistance than alloys containing small amounts of

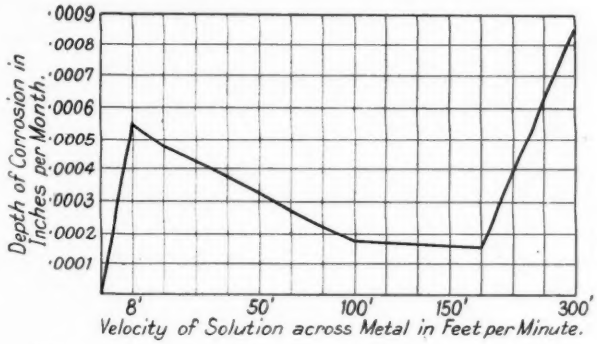


FIG. 2.—VELOCITY TESTS WITH 20% H_2SO_4 ON LEAD.

antimony or copper; this being due probably to the firmer adherent protective film that is formed on pure lead.

Hard Lead—Lead Alloys or Regulus Metal

As opposed to the employment of pure lead for chemical plant, it is often found desirable to employ a form of hard lead or regulus metal. There are many applications where lead is most desirable from all points of view, except by reason of its excessive softness. This necessitates the use of some form of hardened lead or lead alloy, and regulus metal of varying degrees of hardness is usually resorted to for such purposes. While not quite so thoroughly acid-resisting as pure lead, the greater mechanical strength of these alloys more than compensates for this drawback.

Hard lead or regulus metal has a wide application for castings in the form of vessels, pans, frames, and other constructional pieces of plant in contact with acid. This alloy is of considerable advantage for the manufacture of acid pumps, fans for acid gases, valves, taps and ejectors for acids, as well as plugs and various machineable parts.

To ensure that the regulus metal should satisfactorily resist the action of sulphuric acid of various concentrations up to, say, 80 per cent., it is important that it should be made of new metals comprising lead of 99·9 per cent. purity and antimony of 99·5 per cent. purity. Otherwise it will be found difficult to obtain castings free from flaws or segregations. The antimony content in regulus metal is a varying quantity, and alloys recommended for various purposes may contain anything from 5 to 12 per cent. of antimony. It has been found that the following mixtures of regulus metal are very satisfactory for various applications:—

1. Regulus metal containing 6 to 8 per cent. of antimony, for the construction of pans, tanks, acid eggs and containers of various forms.

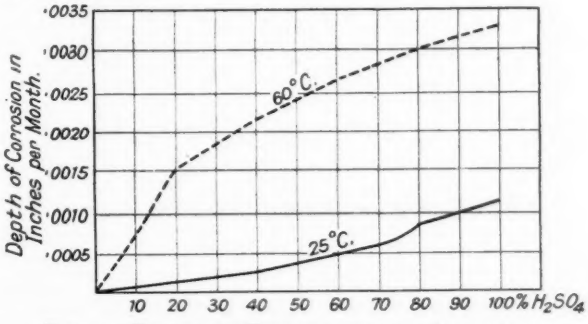


FIG. 3.—EFFECT OF TEMPERATURE ON CORROSION: H_2SO_4 ON LEAD.

2. Regulus metal containing 8 to 10 per cent. of antimony, for valves, taps, acid pumps, ejectors, plugs, and various working parts which require to be machined and have to withstand mechanical action and abrasion.

3. Regulus metal containing 10 to 12 per cent. of antimony, suitable for castings to be machined and tooled all over, such as finished parts, jets, nozzles, screws, and other small parts.

In connection with these compositions, attention may be drawn to the Standard Specifications for chemical lead and regulus metal (Nos. 334 and 335) issued recently by the British Engineering Standards Association, which were noted in THE CHEMICAL AGE of June 23 (pp. 568–569).

Tensile Strength of Regulus Metal

These regulus alloys possess a greater tensile strength than pure lead, as follows :—

PERCENTAGE OF ANTIMONY.	ULTIMATE TENSILE STRENGTH PER SQ. INCH.
6 to 8	2·5 tons
8 to 10	3·5 ,,
10 to 12	3·6 ,,
12 or over	4·0 ,,

It must be evident that it is only by the combined energies of the chemist, the chemical engineer, and the lead manufacturer, can the best results for industry in the use of lead be achieved. It is hoped that the few observations collected and presented in this paper may encourage some fuller consideration of this subject, which is of outstanding importance to chemical engineers.

A Register of Chemists

To the Editor of THE CHEMICAL AGE.

SIR,—The Council has recently decided that a register of members of the British Association of Chemists shall be prepared for publication subject to the approval of the members themselves, and since it is anticipated that few members are likely to raise any objection, publication will probably take place in the immediate future.

Having regard to another recent decision of the Council, the matter is one of very great importance, but leaving aside a motive which it would at present be premature to discuss, it is hoped that this decision will lay at rest once and for all the suggestion which has been made from time to time—it is one with no basis in fact—that the Council were, for some reason not specified, very desirous of veiling in secrecy particulars of the Association's membership.

A charge is not erroneous the less because it is vague, but it has the advantage for those who make it that it need not be supported by any evidence whatever. It is quite true that the Council have in the past been opposed to the publication of a register, but the grounds have been merely those of expense. If the register is to be of practical use fairly frequent revision is necessary, and since our members have always insisted, and rightly insisted, that no expenditure that could not be completely justified ought to be made, the matter has not received serious consideration until now. The annual general meeting, however, with new facts before it, recommended that steps in this direction should be taken, and the matter is accordingly going forward.

It is to be hoped that this information will finally clear up any misunderstanding that may exist. The question is one of importance, since there is good reason to believe that many members of the profession have hesitated to take up membership on this account. This difficulty, at any rate, need not in future deter them.—I am, etc.,

HENRY T. F. RHODES,
General Secretary,
British Association of Chemists.

175, Piccadilly,
London, W.1.

Imperial Chemical New Issue

THE new issue of 3,363,855 ordinary shares of £1 each and 2,242,570 deferred shares of 10s. each in Imperial Chemical Industries was over-subscribed to the extent of more than £11,000,000. The number of shares in respect of which the rights to subscribe were not exercised is so small in relation to the surplus number of shares applied for, that the directors have decided to allot these surplus shares to shareholders who are in the employ of the company and its subsidiaries. There are no surplus shares available for those shareholders who applied for them, and no separate letters of regret will be posted.

British Acetate Silk Meeting

A New Process Acquired

SOME important factors to be considered in commencing the manufacture of artificial silk were stressed by Sir E. Manville at the statutory meeting of the British Acetate Silk Corporation, Ltd., in London on Wednesday, July 4. The Bulmer Rayon Co., he said, in anticipation of its purchase by the new company, took the responsibility of planning extensions in regard to buildings and plant required, both for viscose and acetate silk, with the result the new company had the advantage of being assured of a largely increased output at the dates mentioned in the prospectus. Those who had followed the progress of the newer artificial silk companies must have been impressed by the fact that it was a business in which, during development, large overhead charges were incurred before production was achieved. In addition, there was the difficulty, in so new an industry, of obtaining a highly technically skilled staff. He thought the corporation was in a unique position with regard to these essentials for the spade work, and the Bulmer Rayon Co. had eliminated these obstacles. The prospectus had stated that the production of the viscose plant would reach a total of seventeen tons a week by July 1928, and twenty-seven tons a week by September. Production this week was thirteen tons and by the end of the month would reach seventeen tons. There was no reasonable doubt that plant would be sufficiently advanced to reach the contemplated full output by the end of September.

Cellulose Acetate Developments

The cellulose acetate programme was up to date and the installation of the spinning plant was ahead of it. The acetate silk was already highly spoken of in the trade, and by April next fifty tons a week would be produced. Approaches had been made to the company by concerns using cellulose acetate with a view to purchase of surplus for making aeroplane dope and varnishes. At present all material was required for the production of silk, but acceptance of such orders would be considered later. By the foresight of Sir William Bulmer an exclusive licence for the United Kingdom and Ireland was obtained for a new acetate process which would have the effect of materially reducing the cost of production of cellulose acetate, and plant had been ordered for the working of the new process. The German rights of this patent had been obtained by the I.G., which was now operating the process at the Leverkusen Acetate factory. In conclusion, stated Sir E. Manville, the board looked forward to the future with the greatest confidence.

Hydrogenation Work at Birmingham

Report of the Mining Research Laboratory

THE report of the work of the Mining Research Laboratory of Birmingham University during the past year dealing with the hydrogenation of coal, states that a considerable number of coal samples from different seams and of different composition had been tested under, as far as practicable, the same conditions of temperature and pressure. These experiments showed clearly that the yield of oil by hydrogenation under high pressure depended upon the composition of the coal. Investigation of the constituents of coal which undergo hydrogenation was being made in the case of several coals. The action of steam upon coal was being also investigated, as this would appear to have, in the case of some coals at any rate, an important influence on the oil yield. Little information was available regarding the behaviour of steam upon different coals at various temperatures. It was evident from the erection of large plants in Germany for the hydrogenation of brown coal and bituminous coal, that the process was believed by some to have reached a practical stage. "We believe," adds the report, "that the knowledge now being accumulated as a result of our researches will be of considerable service in indicating the applicability or otherwise of the hydrogenation method to any one coal. A new high-pressure bomb has been made in the mechanical engineering department to our design for the purpose of dealing with small quantities of material. By means of this it is hoped to obtain information more quickly than with the larger autoclave and especially in the case of products or materials of which we can obtain only a small quantity in the laboratory."

No Special Post for Samples

Deputation to the Postmaster General

THE deputation, representing among others, the Federation of British Industries, the Association of British Chemical Manufacturers, and the National Federation of Associated Paint, Colour and Varnish Manufacturers, which waited on the Postmaster-General on Thursday, July 5, was received by General Williamson before whom were laid certain anomalies to which business men were subjected by printed paper rate regulations. The deputation suggested that steps should be taken by the Postmaster-General to establish a sample post under which it would be possible for British manufacturers to send out samples which were at present refused admission to the printed paper rate. Reference was also made to disadvantages suffered by British postal users as against foreign users of foreign samples post, and it was suggested that steps should be taken to standardise the terms and regulations governing the postage of this class of matter. In reply to the deputation, General Williamson pointed out that there was a general concensus of opinion that if concessions were to be made, more benefit would be given by a return to the pre-war penny postage than by any other step. The existing printed paper rate represented a definite loss on each package carried, and while anomalies existed the Post Office endeavoured to be liberal in interpreting the present regulations to the benefit of the user. He referred to previous experiments with inland sample post and pointed out that these had not been a success. He could not understand the representations with regard to the foreign sample post, as regulations for this were laid down by the International Postal Convention. As the rates were based on the gold franc, British users had a slight preference in the existing regulations. He regretted that the Postmaster-General was not in a position to re-introduce an inland sample post so long as there was any prospect of a return to the penny post. If that was restored, many of the existing disadvantages felt by postal users would no longer exist.

Cost of Strikes: 1,000 Millions in Five Years

THE movement towards peace in industry was carried another step at the Mansion House on Tuesday. A large gathering of the members of the Industrial Peace Union of the British Empire and of the Empire Trade League unanimously decided to combine their two organisations for the better and more efficient conduct of the campaign in which they are engaged. The Lord Mayor presided.

Mr. L. S. Amery, Colonial Secretary, said it was essential in the interests of capital that labour should be well paid and that the standard of living of our people should be high, because those things meant a rich home market, which was the best assurance for a steady output. It was no less to the interest of labour that industry should continuously draw to itself fresh brains and capital by the hope of adequate reward. Fresh capital must be accumulated and re-invested in British industry. That progress was not more rapid was due to the difficulties of assured markets for the products of new development. Yet the market was there, and we had only to combine our markets to realise that we had a market large enough for all that we could put out.

Sir Robert Horne said that by industrial peace alone could we return to our former prosperity. Industrial strife could bring nothing but disaster and catastrophe. A Labour Member of Parliament had computed that from 1920 to 1925 labour troubles in this country had cost over 1,000 millions sterling. The mere interest on that sum represented 9d. in the pound income tax, or twice the sum that Mr. Churchill was endeavouring to raise from the petrol tax.

Sir Ernest Benn, in supporting, said he took second place to no man in his love for labour, but no service was rendered to a man by making him forget that it was more difficult to sell a thing than to make it. A good motto for those who sought to make strife in industry could be taken from Proverbs 23: "It is an honour for a man to cease from strife, but every fool will be meddling." (Laughter.)

The Lord Mayor said that promises of money to the amount of £200 had been handed to him.

Chemical Matters in Parliament

Deaths from Industrial Silicosis

In reply to a question by Mr. Will Thorne (House of Commons, July 4) regarding industrial silicosis contracted by workers in a scouring powder works at Wandsworth, the Home Secretary stated that a full report has been submitted to him by the medical inspectors of factories who attended the inquest and investigated the circumstances. In the opinion of the medical inspectors these cases originated when the mixing and filling of the powder were done by hand. At the beginning of 1927, on the instructions of the district inspector of factories, mechanical methods of working were introduced. The plant since that date had been totally enclosed and exhaust ventilation applied to all points where dust was liable to escape. He was advised that the present arrangements should prove effective, but they would continue to receive close attention.

Dead Sea Concession

Replying to Mr. Maclean (House of Commons, July 5), Mr. Amery said that no terms and conditions had been settled upon which the Dead Sea Concession had been offered to Major Tulloch and Mr. Novomeysky.

Poison Gas Manufacture

In a question to the Government (House of Lords, July 11) Lord Davenport raised points relating to the manufacture of poison gases in Germany, and their use in time of war and the necessity for defence against gas attacks from the air. Lord Rayleigh agreed it was impracticable to prevent people in Germany and other places manufacturing noxious gases and suggested precautions should be taken to evacuate London in a regular manner. The Marquess of Salisbury, in reply, said that one ought to be very careful what one said on topics of that description. The dangers were not without foundation, but there was the danger of over alarming the public mind, even of panic. He did not think there was any danger of that. Anyone who listened to Lord Rayleigh must recognise that if the last word of science had not been said in attack, so also it had not been heard in defence. The question of German disarmament and the obligations upon the German Government had passed from the control of the allied and associated powers to the League of Nations. The development of a defensive organisation against air raids was engaging the continuous attentions of the Air Ministry and the War Office, and adequate provision had been made, particularly during the last few years, for the defence of the country against air attack.

Statutory Meeting of Ruths' Steam Storage

THE statutory meeting of Ruths' Steam Storage, Ltd., was held in London on Friday, July 6, Mr. F. E. Powell (chairman) presiding. The Ruths system, the Chairman pointed out, could be used in connection with any industrial steam plant, required no special building, used no fuel, and involved no maintenance or additional labour. As there was no necessity of investing in any expensive work or construction the company was entirely free to make connections which would secure their having accumulators built on the most favourable terms for customers. At present there were outstanding tenders amounting to £600,000, showing that there was a real desire on the part of steam users to investigate closely the cost and operation of this kind of apparatus. A recent development that meant a very important addition to the company's prospects for the future consists of their having acquired the entire right for the sale of the Ruths accumulator in the United States and Canada on favourable terms.

Appointments Vacant

Temporary Assistant Chemists in the Government Laboratory.—The Government Chemist, Clement's Inn Passage, London, W.C.2. August 4.

Lecturer in Applied Chemistry in the University of Queensland.—The Secretary, Queensland Government Offices, 409-410, Strand, London, W.C.2.

Laboratory Stewards for the Chemistry Department, University College of Hull.—The Secretary, University College, Hull. July 30.

From Week to Week

MR. R. T. DUDGEON has been appointed quarry manager with the British Phosphate Commission, Ocean Island.

SOFNOL, LTD., chemical manufacturers, of Greenwich, have had their telephone numbers changed to Greenwich 1600–1.

A FIRE OCCURRED at the works of the Stocal Enamel Co., Burton-on-Trent, on Tuesday, and the packing department of the firm was destroyed.

MR. F. B. MENADUE, chief chemist of the Barnet Glass Rubber Co., Ltd., has left Sydney on an extended business trip to Europe and America.

THREE BARRELS OF SULPHUR exploded in Budapest on Tuesday as a result of abnormal summer heat that prevails there, and three people were killed.

THE PROMOTION OF SCIENTIFIC RESEARCH with a view to the improvement of the industrial technique is among the proposals put forward by the Labour Party in a draft programme for the next general election.

OWING TO PRESSURE of other work, Dr. A. S. Russell, of Oxford, has been compelled to resign his assistant-editorship of *British Chemical Abstracts*. His successor is Dr. J. J. Fox, of the Government Laboratory.

MR. C. A. MENDELSOHN, an analytical chemist, of Melbourne, who came from Australia to attend the International Dairying Congress, has been commissioned by the Victorian government to report on the manufacture of potato by-products in other countries.

THE CREAM OF TARTAR Co. of Australia, Ltd., Granville, N.S.W., has completed the manufacture of the first cream of tartar and tartaric acid made in New South Wales. The factory and plant, which cost £150,000, will manufacture 100 tons of each product monthly.

SIR JOSIAH STAMP accompanied by members of the L.M.S. Railway staff visited Lount Colliery, Leicestershire, on Wednesday in connection with a scheme for the extraction of oil from coal. It is claimed that the plant inspected produces 22 gallons of oil and 13 cwt. of smokeless fuel from one ton of coal.

AT THE ANNUAL MEETING of the Manufacturing Chemists' Association in New York in May the following officers were elected:—President, Mr. H. Howard (Grasselli Chemical Co.); vice-presidents: Mr. W. D. Huntington (Davison Chemical Co.) and Mr. H. A. Galt (Pittsburgh Plate Glass Co.); treasurer: Mr. P. Schleussner (Roessler and Hasslacher); secretary: Mr. J. I. Tierney.

CAPTAIN ALFRED LOEWENSTEIN is believed to have been drowned in mysterious circumstances by falling from his aeroplane while crossing the English Channel on Thursday, July 5. Captain Loewenstein, it will be remembered, was engaged through the International Investment and Holding Co. in a long, and finally unsuccessful, struggle to gain control of British Celanese, Ltd.

THE NEW UNIVERSITY COLLEGE BUILDING, Nottingham, which has been presented to the University by Sir Jesse Boot, was opened on Tuesday by the King. Speaking of the generosity of Sir Jesse Boot, the King said "It is a matter for general congratulation when those who possess the means to do so, come forward to assist universities and colleges in the provision of that higher education which is the surest road of progress in the arts and sciences underlying and sustaining our civilisation."

UNIVERSITY NEWS.—*London*: Professor J. Norman Collie, F.R.S., has been admitted to an honorary fellowship of University College. Mr. H. Toms of the chemical department of East Ham Secondary School, has been awarded the degree of Ph.D.—*Edinburgh*: At the graduation ceremony on Thursday, June 28, the honorary degree of Doctor of Laws was conferred on Professor F. G. Donnan and Mr. Henry S. Wellcome. The degree of D.Sc. was conferred on Mr. A. R. Urquhart, for a thesis on "The absorption of water by cotton."

A FUND is being raised to provide for the education of the three children of the late Dr. Geoffrey Weyman, chief chemist to the Newcastle-on-Tyne and Gateshead Gas Co. from 1910 to 1927. The promoters of the fund are making a general appeal to the chemical and gas industries, since they desire that it should be regarded as a tribute to his outstanding work in connection with the carbonisation of coal and the purification of gas. The Benevolent Fund Committee of the Institute of Chemistry has been authorised to supplement the Fund and generally to co-operate in the scheme.

SIR ARTHUR DUCKHAM, who has accepted the leadership of the economic mission to Australia which has been appointed by H.M. Government in conjunction with Mr. Bruce, Prime Minister of Australia, sails at the end of August. Sir Arthur's colleagues on the mission are Sir Hugo Hirst, chairman and managing director of the General Electric Co., Sir Ernest Clark, a director of the Underground Railway Companies, and Mr. Dougal Malcolm, member of the executive committee of directors of the British South Africa Co. Lady Duckham, their daughters, and son will accompany Sir Arthur to Australia.

RECENT WILLS INCLUDE: Mr. William Windus, of Bristol, lately a director of the United Alkali Co., Ltd.; £44,651.

THE REGISTER of Fellows, Associates and Students of the Institute of Chemistry, dated June, 1928, and corrected to April 30, 1928, has been issued.

THE IMPORTS OF CHEMICALS INTO MALAYA during January-February totalled £328,322, as compared with £368,766 during the corresponding period of 1927.

THE BODY OF William Henry Lowe, aged 51, a worker at the works of the West Norfolk Farmers' Chemical Co-operative Co. was found in the River Nar on Wednesday, July 4.

HOWARDS AND SONS, LTD. announce that their works and warehouses will be closed for the annual works' holiday from Saturday morning, July 28, to Tuesday morning, August 7.

IMPERIAL CHEMICAL INDUSTRIES, LTD. are stated to have purchased 800 acres at North Auckland, New Zealand, with a view to prospecting for mercury and 800 test bores have been made. Large works will probably be erected.

AN AGREEMENT HAS BEEN MADE with Braunkohlengas G.m.b.H. to erect an experimental plant at Cassel for the production of gas from brown coal. If the experiment is successful, it is intended that the whole town's gas supply shall be made from this source.

THE NEW ZEALAND GOVERNMENT has decided to send Dr. Marsden, secretary of the New Zealand Department of Scientific and Industrial Research, to spend three months in Canada and the United States to arrange co-operation and to investigate the organisation of various research associations in industries.

THE BRITISH RIGHTS of the Vandergrift Coal Distillation Process have been acquired by Magdalena Securities, Ltd., of London. According to tests and experiments during the last five years, it is stated that a ton of average bituminous coal yields 25 to 50 gallons of crude oil and 4,000 to 6,000 cubic feet of gas, giving 300 B.T.U. per cubic foot, while the residue constitutes an excellent smokeless fuel with high calorific values.

PROFESSOR THOMAS TURNER, Emeritus Professor of Metallurgy at Birmingham University, has been spending a holiday in Australia. He subscribes to the opinion that except in a few instances Australia's metal deposits are not being developed to the extent they should be. The essential conditions for profitable working of metal deposits, high output, efficient machinery and low labour costs, with one or two exceptions, do not seem to prevail in Australia, he states.

ARTIFICIAL SILK NEWS.—The directors of an artificial silk company in Saxony have been fined £75 each for attempting to obtain from workmen secret information relating to methods employed by another artificial silk firm at Elberfeld.—An issue of shares will shortly be made by Alliance Artificial Silk, Ltd., which has been formed principally to acquire the exclusive rights for the manufacture in the British Empire of cellulose acetate by the purchase of the process and patents of Syntheta A.G. Basle. A factory is to be built at Lowestoft.

SALES OF NITRATE OF SODA reported by the Producers' Association during the fortnight ended the 30th ult., amounted to 4,833 metric tons for shipment during the 1927-28 nitrate year, and to 123,659 metric tons for delivery in the 1928-29 season. Total sales of the fertiliser since the introduction of the free selling on April 14, 1927, up to June 30, 1928, were 3,656,605 metric tons (including 525,119 tons disposed of for delivery, 1928-29). It is understood that further sales of the fertiliser have been effected during the past week at prices ranging from 16s. 4d. to 16s. 7d. per metric quintal.

AN IMPORTANT deal is announced by Amalgamated Anthracite Collieries, Ltd. The scheme has for its object the reorganisation of the industry so as to control production and avoid unnecessary price-cuttings. An agreement has been entered into to purchase the Gwaun-Cae-Gurwen Colliery Co., and the Vale of Neath Colliery Co., including the Rock Colliery Co. and the Penhydd Colliery Co., which between them are at present the second largest producers of anthracite coal, with an increasing output expected shortly to equal that of the Amalgamated Anthracite Collieries. The capital of the company will be increased by 2,000,000 ordinary shares of £1 and by the creation of debentures amounting to £3,500,000.

THE FOOD AND DRUGS (ADULTERATION) BILL was the subject of comment by Professor A. Smithells and Mr. E. Hinks in a joint letter to the *Times* on Monday. This Bill it was stated "even as a consolidating Bill it does not bring under one Act all the Acts and Regulations to which those concerned with the production and control of food—public analysts and others—must have regard, the Sale of Food and Drugs Act themselves being only part of the legislation safeguarding the purity of food. The defects which time and experience have revealed in the old Acts are not remedied; we fear that the passage of this consolidating Bill, perpetuating that which is faulty or obsolete along with that which is good will result in the postponement of that new and amending legislation which we believe to be necessary."

Obituary

MR. JOHN BRISTOW, director and many years secretary of the United Flexible Metallic Tubing Co., Ltd., on July 6.

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ORGANIC.—Control of the molecular weight of liquid hydrocarbons produced by electrical discharge in ethane. S. C. Lind and G. Glockler. *J. Amer. Chem. Soc.*, June, pp. 1767–1772.

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Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

291,712. METHYLOL COMPOUNDS OF AMIDES. G. Walter, 18, Meytensgasse, Vienna XIII, Austria. Application date, November 29, 1926. Addition to 284,272 (see THE CHEMICAL AGE, Vol. XVIII, p. 395).

Methylol compounds of organic acid amides such as amides of fatty acids can be obtained by condensation of the initial materials with formaldehyde in the presence of organic solvents and an inorganic base such as caustic alkali. It has been found that solid polymerised formaldhyde, *e.g.*, para formaldehyde, which is insoluble in alcohol goes into solution on the addition of the bases. In an example, paraformaldehyde is dissolved in ethyl alcohol containing potassium hydroxide and acetamide is then added, yielding methylol acetamide.

291,810. PURIFYING COLLOIDAL LIQUIDS, EMULSIONS AND THE LIKE, PROCESS AND APPARATUS FOR. M. G. W. Hummelinck, Vlaardingen, Holland. Application date, December 8, 1926.

The liquid is passed through a filter cloth or wire mesh, the pores of which are wide compared with the particles of the colloidal or suspended bodies. The speed of the liquid through the filtering layer is kept below 1·8 metres per hour, so that the deposit of impurities is not disturbed by the movement of the liquid. The filtering material is preferably fibrous. Several constructions of filters are described in detail.

291,814. ANTHRAQUINONE DERIVATIVES MANUFACTURE OF. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester, A. Shepherdson, W. W. Tatem, and F. Lodge, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, December 13, 1926.

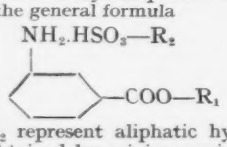
These derivatives constitute intermediates and dyestuffs for acetate silk. Symmetrical 1 : 4-dialkyl-diamino-anthraquinones are heated with concentrated sulphuric acid or sulphuric acid monohydrate at a temperature above 150° C., or if boric acid is also present, at 130° C., the reaction being a process of dealkylation. In the manufacture of the dialkyl-diamino-anthraquinones from leuco dialkyl-diamino-anthraquinones by oxidation in sulphuric acid, the process may be effected without isolation of the dialkyl-diamino-anthraquinone by adjusting the acid strength of the mixture and further heating. An example is given.

291,825. VAT DYESTUFFS CONTAINING SULPHUR, MANUFACTURE OF. W. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 3, 1927.

Indigoid vat dyestuffs are obtained by condensing a monoalkyl-,arylkyl-, or arylether of 4-mercapto-1-naphthol in which the hydrocarbon radicle is attached to the sulphur or a derivative with a reactive α-derivative of an isatin such as isatin chloride or anilide. In an example, the monomethyl-ether of 4-mercapto-1-oxynapthalene is treated with dibromo-isatin chloride. The product dyes fast greenish-blue shades.

291,850. EASILY SOLUBLE DERIVATIVES OF METAAMINOBENZOIC ACID ESTERS, PROCESS FOR THE PREPARATION OF. G. B. Ellis, London. From Chemical Works, formerly Sandoz, Basle, Switzerland. Application date, March 4, 1927.

Paraaminobenzoic acid esters have been used as surface anæsthetics, and in this invention salts of metaaminobenzoic acid alkyl esters with alkyl sulphonic acids are employed. These salts have the general formula



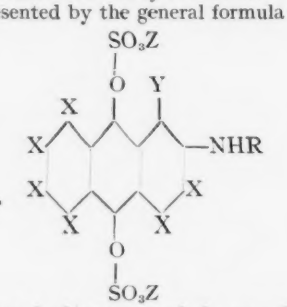
where R_1 and R_2 represent aliphatic hydrocarbon radicles. These salts are obtained by mixing equimolecular quantities of the acid and meta-amino-benzoic acid ester, or by a double decomposition of salts of sufficient solubility such as hydrochlorides, hydrobromides, sulphates of metaaminobenzoic acid esters and alkali and alkaline earth salts of alkyl sulphonic acids in suitable solvents. The salts are not hydroscopic but easily soluble in water, and the solutions are stable when heated to boiling, so that they can be sterilised. A number of examp'es are given.

291,827. DYESTUFFS, TREATMENT OF. D. Gardner, 37, Rue Charles Floquet, Rueil (Seine et Oise), France. Application date, February 5, 1927.

The object is to treat dyestuffs which are insoluble or slightly soluble in water to render them water-soluble without loss of any of their original properties. The dyestuffs are treated with anhydrous tetrachlorides or tetrabromides of metals of the fourth group of the periodic system, such as titanium or tin chloride sometimes with the aid of a water-soluble anhydrous organic solvent. The process is applicable to indanthrene, indigo, indigoids, aniline black, purpurin, rhodamine B extra, etc. In most cases it is necessary to employ a water-soluble organic solvent such as glacial acetic acid, phenol glycerine, etc., to assist in obtaining the dyestuff in water-soluble condition. The reaction can be effected in the cold, or more rapidly at a higher temperature. Examples are given.

291,851. DYESTUFFS OF THE ANTHRACENE SERIES, MANUFACTURE OF. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 7, 1927.

These dyestuffs are obtained by the action of an oxidising agent at 75°–95° C. in slightly acid solution on a 9 : 10-disulphuric acid ester or a salt thereof, of an anthrahydroquinone which contains in beta position an amino group which may be mono-substituted and may have any substituent in the nucleus provided that the α-position which is an ortho position to the amino group is unoccupied. The mixture during oxidation should be just acid towards Congo red so that the acid liberated during the reaction must be nearly neutralised. The parent materials are represented by the general formula



where R represents hydrogen, methyl, etc., X represents hydrogen or a substituent, Y represents hydrogen, and Z represents hydrogen, a metal, or a base. The dyestuffs obtained are of the type N-N-dihydro-1 : 2 : 2′ : 1′-anthraquinoneazine, and a number of examples of their production are given.

291,867. OLEFINES, PRODUCTION OF. A. W. Nash, "Hapri," Warwick Road, Solihull, Warwickshire A. R. Bowen, 63, Bromyard Road, Worcester, and O. C. Elvins, 701, Coventry Road, Birmingham. Application date, March 9, 1927.

The object is to use commercial mixtures containing carbon monoxide and hydrogen, such as water-gas, for the synthetic production of olefines. Good yields can be obtained when the carbon monoxide is in excess, employing a catalyst consisting of a mixture of oxides of copper, cobalt, and manganese, which has been reduced in hydrogen before use. The temperature of the reaction should be 280°–300° C., and the pressure atmospheric. The product is a mixture of gaseous, liquid, and solid olefines, together with saturated hydrocarbons and small quantities of oxygenated compounds. Examples are given.

(*Continued on page* 35)

(*Continued from page 34*)

291,878. VAT DYESTUFFS OF THE ANTHRAQUINONE SERIES, MANUFACTURE OF. W. Carpmael. London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 10, 1927.

These vat dyestuffs are obtained by condensing 1-amino anthraquinone-2-aldehyde with a halogen anthraquinone or a derivative or substitution product in the presence of an agent such as sodium acetate, which combines with the liberated acid, and of a catalyst which facilitates the elimination of halogen halide, such as copper or a copper salt. The primary products obtained are not stable but can be converted into stable compounds of vat dyestuff character by treating with acid and alkaline reagents. This may be done by vatting the condensation products with alkaline hydrosulphite, and dyeing on cotton. The primary compounds obtained can also be further condensed with aniline. Some examples of these products and of their further treatment are given.

291,886. NITRATION OF ANTHRONE AND PREPARATION OF 2 : 7-DINITRO-ANTHRAQUINONE. W. Carpmael, London, From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 11, 1927.

Anthrone is nitrated with strong nitric acid to obtain a product in which the nitro groups are mainly in the β-position. This product may be boiled with an indifferent solvent such as glacial acetic acid or acetic anhydride to obtain 2 : 7-dinitro-anthraquinone. Other indifferent solvents such as nitro-benzene, or dichloro-benzene may be used.

291,887. TRIPHENYL METHANE DYESTUFFS, MANUFACTURE OF. W. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 11, 1927.

These dyestuffs are obtained by condensing two molecules of an aromatic ortho-oxy-carboxylic acid with one molecule of 4-benzyl-amino-3-sulpho-benzaldehyde or a salt, and oxidising the leuco acid. 4-benzyl-amino-3-sulpho-benzaldehyde is made by condensing one molecule of benzyl-*o*-sulphanilic acid with one molecule of 4-tolyl-hydroxyl-amine-2-sulphonic acid with one molecule of formaldehyde to form the benzylidine compound from which the aldehyde is obtained by saponifying. These dyestuffs are distinguished from those made with other aldehydes by greater fastness to light.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention : 263,873 (R. Sajitz and E. Pott), relating to sulphonic acids, see Vol. XVI, p. 285 ; 265,233 (I.G. Farbenindustrie Akt.- Ges.), relating to manufacture of esters, see Vol. XVI, p. 381 ; 267,132 (I.G. Farbenindustrie Akt.-Ges), relating to aromatic compounds and sulphonic acids, see Vol. XVI, p. 487 ; 267,940 (I.G. Farbenindustrie Akt.-Ges.), relating to condensation products from aromatic hydrocarbons or derivatives, see Vol. XVI, p. 515 ; 271,523 (R. J. A. Grenier), relating to manufacture of hydrogen, see Vol. XVII, p. 115 ; 274,104 (H. T. Böhme Akt.-Ges., and H. Bertsch), relating to sulphonation products from fats, oils, or their acids, see Vol. XVII, p. 261 ; 275,927 (I.G. Farbenindustrie Akt.-Ges.), relating to benzanthrone derivatives, see Vol. XVII, p. 352 ; 284,248 (Compagnie des Metaux Averpelt-Lommel), relating to roasting and/or sintering of fine ore or other fine material, see Vol. XVIII, p. 31 (Metallurgical Section).

International Specifications not yet Accepted

289,885. PURIFYING GASES. F. Fischer, 2, Kaiser-Wilhelm Platz, Mulheim, Germany. International Convention date, May 5, 1927.

Gas containing hydrogen sulphide are purified by alkaline potassium ferricyanide. Sulphur and potassium ferrocyanide are formed, and the latter is electrolysed to the ferricyanide. The hydrogen liberated is added to the gases and the alkali formed is mixed with the ferricyanide.

290,174. TITANIUM COMPOUNDS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 6, 1927.

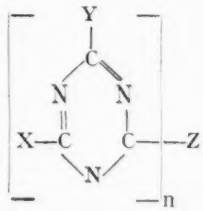
Titanium ores are treated with sulphuric acid, and sodium, potassium, or ammonim sulphate, then added so that a saturated solution is obtained from which the double salt can be crystallised. A solution in dilute sulphuric acid or a suspension in water yields titanic acid by hydrolysis under pressure.

290,175. CYCLIC AMINES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 7, 1927.

Homologues of aniline are treated with hydrogen under pressure of 50–200 atmospheres and a temperature of 170°–350° C. in the presence of copper, a metal of the platinum or iron group, or oxides or salts of these. The hydrogenation of *o*-, *m*-, and *p*-toluidine, *p*-xylidine, and β-naphthylamine is described.

290,178. VULCANISING RUBBER. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, May 7, 1927.

Rubber is mixed with a compound having the general formula



where X and Y are any residues, and Z is hydrogen or a radicle connected with the carbon atom by N, O, or S. The compounds are made by the substitution of one or more of the halogen atoms of a cyanuric trihalide by one or more molecules of ammonia or a mono- or di-substitution product such as hydrazine, or an amine.

290,179. DYES. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, May 7, 1927.

The chromium compound of the monoazo dyestuff 1 : 2-amino-naphthol-4-sulphonic acid→1-naphthol, obtained as described in specification 191,972 (see THE CHEMICAL AGE, Vol. VIII, p. 214) is heated under reflux with aqueous or alcoholic sodium sulphide and sulphur. Reddish-blue to blue shades are obtained on cotton. The monoazo dyestuff 1 : 2-aminonaphthol-4-sulphonic acid→5 : 8-dichloro-1-naphthol is chromed in an alkaline medium and the chromium compound heated under pressure at 120°–150° C. with alcoholic sodium sulphide and sulphur. Greenish-blue shades are obtained on cotton.

290,189. ACID-PROOF LININGS FOR VESSELS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 9, 1927. Addition to 283,964. (See THE CHEMICAL AGE, Vol. XVIII, p. 271.)

Acid-proof linings are formed from slabs of alloys of silicon and copper, chromium, manganese or tungsten.

290,192. CONDENSATION PRODUCTS OF ALCOHOLS AND KETONES WITH UREA, ETC. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 9, 1927. Addition to 278,390 and 287,095. (See THE CHEMICAL AGE, Vol. XVII, p. 515, and Vol. XVIII, p. 495.)

Urea, thiourea, or a derivative is condensed with an alcohol, a ketone, or a derivative, and an amino compound not of the urea type, in the presence of an alkali, or alkaline earth, or zinc group metal. The products are viscous or resinous, and water-soluble. In an example, glycol, urea, *p*-toluene-sulphamide, and sodium amalgam are used.

290,229. SULPHONIC ACIDS. I.G. Farbenindustrie Akt.-Ges. Frankfort-on-Main, Germany. International Convention date, May 10, 1927.

6-chloro-2-amino-1-methyl-benzene is sulphonated to obtain 6-chloro-2-amino-1-methyl-benzene-3-sulphonic acid, 6-chloro-2-amino-1-methyl-benzene-5-sulphonic acid, or 6-chloro-2-amino-1-methyl-benzene-3 : 5-disulphonic acid, according to the conditions. Details of the sulphonation process are given.

LATEST NOTIFICATIONS

293,201. Method of treating nitrocellulose. Hercules Powder Co. July 1, 1927.
292,938. Refrigeration apparatus. Silica Gel Corporation. June 27, 1927.
292,990. Manufacture of photographic antihalation plates or the like. I.G. Farbenindustrie Akt.-Ges. June 29, 1927.
292,991. Process for the manufacture of potassium manganate. Soc. Chimique des Usines du Rhone. June 29, 1927.
292,995. Process of producing ammonium sulphate. Soc. Anon. des Fours A Coke Semet-Solvay and Piette. June 29, 1927.
293,022. Treatment of cellulose derivatives. British Celanese, Ltd. June 30, 1927.
292,950. Manufacture of N-oxyethyl-derivatives of 2-amino-1-oxybenzene. I.G. Farbenindustrie Akt.-Ges. June 27, 1927.
292,951. Process for the high concentration of nitric acid. Du Pont de Nemours and Co., E. I. June 27, 1927.
293,028. Drying-apparatus. I.G. Farbenindustrie Akt.-Ges. June 30, 1927.
293,302. Synthesis of chemical substances. Polanyi, Dr. M., and Bogdandy, Dr. S. Von. July 2, 1927.
293,000. Process for colouring, sizing, impregnating, or otherwise treating paper. I.G. Farbenindustrie Akt.-Ges. June 29, 1927.
293,001. Process for the manufacture of hydrogenation products of compounds containing ether-like linkages. Schering-Kahlbaum Akt.-Ges. June 29, 1927.
293,003. Process for washing gases and vapours. I.G. Farbenindustrie Akt.-Ges. June 29, 1927.
293,040. Process for preparing sodium nitrogen compounds. Deutsche Gold-und Silber-Scheideanstalt Vorm. Roessler. July 1, 1927.
293,006. Process for producing fast tints on ethers or esters of cellulose. Soc. of Chemical Industry in Basle. June 29, 1927.
293,316. Manufacture of ethers or esters of carbohydrates of the type $(C_6H_{10}O_5)_x$. I.G. Farbenindustrie Akt.-Ges. June 30, 1927.

Specifications Accepted with Date of Application

268,754. Metallic compounds of *o*-hydroxy-azo dyestuffs. I.G. Farbenindustrie Akt.-Ges. March 31, 1926.
271,863. Preserving rubber latex. I.G. Farbenindustrie Akt.-Ges. May 28, 1926.
271,884 and 272,225. Anthraquinonyl ketones, Manufacture of. I.G. Farbenindustrie Akt.-Ges. May 25, 1926, and June 7, 1927. 272,225 addition to 271,884.
272,556. Valuable liquid hydrocarbons and their derivatives, particularly those of low boiling point from coal, tars, mineral oils, and the like, Manufacture and production of. I.G. Farbenindustrie Akt.-Ges. June 14, 1926.
278,742. Precious metals from the ores thereof, Recovery of. S. B. McClusky. October 8, 1926.
280,881. Electrolytic extraction of aluminium. Aluminium Industrie Akt.-Ges. November 22, 1926.
282,779. Detinning processes. Q. Marino. December 27, 1926.
283,181. Soluble cellulose esters of higher fatty acids. I.G Farbenindustrie Akt.-Ges. January 6, 1927.
284,322. Ammonium phosphate fertiliser composition, and method of making the same. American Cyanamid Co. January 28, 1927.
292,629. Phenol-formaldehyde condensation products, Process for the manufacture of. G. Bia and J. E. D. de G. de Bielize. January 17, 1927.
292,660. Copper compounds of substantive azo dyestuffs, Manufacture of. K. Carpmael and K. S. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). March 18, 1927.
292,669. Absorbing hydrogen sulphide or hydrogen sulphide and ammonia from gases. K. Carpmael and K. S. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). March 21, 1927.
292,690. Annealing of Metal. H. W. Brownsdon and Kynoch, Ltd. March 25, 1927.
292,741. Vat dyestuffs, Manufacture of. O. Y. Imray. (*I.G. Farbenindustre Akt.-Ges.*). May 5, 1927.
292,832. Low grade ores, Treatment of. R. Anthoine. November 7, 1927.
292,896–7. Dyestuffs of the anthraquinone series, Process for the manufacture and production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). March 18, 1927.
292,749. Hydrocyanic acid from formamide, Production of. Synthetic Ammonia and Nitrates, Ltd., and T. Ewan. May 21, 1927.

Applications for Patents

Abrassart, A. Low-temperature distillation of fuels. 19,538. July 5. (Belgium, January 12.)
Barrett Co. Recovery of ammonia, etc. 19,724. July 6. (United States, July 16, 1927.)
Boot's Pure Drug Co., Ltd., and Marshall, J. Manufacture of ketones. 19,674, 19,675, 19,676. July 6.
Bowden, R. C., and Evans, P. H. Towers for concentrating sulphuric acid, etc. 19,295. July 3.
British Celanese, Ltd. Manufacture of artificial threads, etc. 19,493. July 5.
British Celanese, Ltd. Manufacture of artificial filaments, etc. 19,614. July 6.
British Celanese, Ltd. Production of compound materials. 19,667. July 6.
Brysilka, Ltd. Preparation, etc., of liquids for manufacture of artificial silk. 19,332. July 4.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of water soluble secondary diazoamino compounds, etc. 19,410. July 4.
Chemische Fabriek Servo, and Rozenbrock, M. D. Sulphonating fatty acids. 19,131. July 2. (Holland, July 9, 1927.)
Coulthard, A. Manufacture of dyes, etc. 19,813. July 7.
Davidson, A., Imperial Chemical Industries, Ltd., Tatum, W. W., and Watts, G. E. Manufacture of 1-amino-anthraquinone-2-sulphonic acid. 19,167. July 2.
Goldschmidt Akt.-Ges., T. Transforming olefines into alkyline chlorhydrins. 19,253. July 3. (Germany, July 11, 1927.)
Holzverkohlungs-Industrie Akt.-Ges. Production of esters. 19,549. July 5. (Germany, August 8, 1927.)
Holzverkohlungs-Industrie Akt.-Ges. Production of esters. 19,677. July 2.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of neutral fats, etc. 19,119. July 2.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of water soluble secondary diazoamine compounds, etc. 19,410. July 4.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of rubber. 19,669. July 6.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J.Y. Treatment of raw silk, etc. 19,670. July 6.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J.Y. Production of water-soluble derivatives of dibasic organic acids. 19,671. July 6.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of organic acids. 19,672. July 6.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J.Y. Production of anthraquinone. 19,673. July 6.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Recovery of nitric acid. 19,816. July 7.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Conversion of hydrocarbons. 19,817. July 7.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of readily condensable nitric oxides. 19,818. July 7.
I.G. Farbenindustrie Akt.-Ges. Containers for cold liquids. 19,118. July 2. (Germany, July 19, 1927.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of ethers, etc. 19,144. July 2. (Germany, June 30, 1927.)
I.G. Farbenindustrie Akt.-Ges. Silicon for pistons of internal-combustion engines. 19,404. July 4.
I.G. Farbenindustrie Akt.-Ges. Manufacture of synthetic rubber 19,411. July 4. (Germany, November 7, 1927.)
I.G. Farbenindustrie Akt.-Ges. Removing sulphur from articles made from viscose. 19,522. July 5. (Germany, July 13, 1927.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of esters of carbohydrates. 19,523. July 5. (Germany, July 11, 1927.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial compositions. 19,668. July 6. (Germany, July 23, 1927.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of synthetic rubber. 19,733. July 6. (Germany, March 31.)
Imperial Chemical Industries, Ltd. Rawlinson, H. and Weil, J. A. Manufacture of ammonium vanadate, etc. 19,252. July 3.
Imperial Chemical Industries, Ltd. Production of acetic acid. 19,772. July 7.
Imperial Chemical Industries, Ltd. Recovery of mercury. 19,773. July 7.
Imperial Chemical Industries, Ltd. Manufacture of dyes, etc. 19,813. July 7.
Lucas, O. D. Crackling liquid hydrocarbons. 19,622. July 6.
Naugatuck Chemical Co. Production of stryol from chlor ethyl benzol. 19,827. July 7. (United States, October 4, 1927.)
Reavell, J. A. Evaporating, etc., apparatus. 19,601, 19,602. July 6.
Rowell, S. W. Production of acetic acid. 19,772. July 7.
Schering-Kahlbaum Akt.-Ges. Manufacture of 3-methyl-6-isopropylene-phenol. 19,307. July 3. (Germany, July 14, 1927.)
Soc. of Chemical Industry in Basle. Manufacture of coloured varnishes. 19,400. July 4. (Germany, July 4, 1927.)
Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 19,401. July 4. (Switzerland, July 12, 1927.)
Traube, W. Manufacture of products from carbohydrates, etc. 19,506. July 5. (Germany, July 26, 1927.)
V. L. Oil Processes, Ltd. Cracking liquid hydrocarbons. 19,622. July 6.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemical

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages extra.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall.; pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised, 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, 2s. 3d. to 2s. 4d. per gall. prompt.

ACID CRESYLIC 99/100.—2s. 7d. to 3s. per gall. 97/99.—2s. 6d. to 2s. 7d. per gall. Pale, 95%, 2s. 4d. to 2s. 5d. per gall. Dark, 2s. 1d. to 2s. 2d.

ANTHRACENE.—A quality, 2½d. per unit. 40%, £5 per ton.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7¾d. to 8d. per gall.

BENZOLE.—Prices at works: Crude, 10½d. to 11d. per gall.; Standard Motor, 1s. 4½d. to 1s. 5d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 6d. to 2s. per gall. Firm. Pure, 1s. 10d. to 2s. 2d. per gall.

XYLOL.—1s. 3d. to 1s. 11d. per gall. Pure, 2s. 3d. per gall.

CREOSOTE.—Cresylic, 20/24%, 9d. per gall.; middle oil, 7d. to 8d. per gall. Heavy, 7⅞d. to 8¼d. per gall. Standard specification, 6½d. to 6¾d. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent 90/160, 1s. 1½d. 1s. 2½d. per gall. Solvent 95/160, 1s. 2d. to 1s. 7d. per gall. Solvent 90/190, 11d. to 1s. 4d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £5 per ton. Whizzed, £8 per ton. Hot pressed, £8 10s. to £9 per ton.

NAPHTHALENE.—Crystals, £13 to £14 10s. per ton. Quiet. Flaked, £13 to £15 per ton, according to districts.

PITCH.—Medium soft, 57s. 6d. to 65s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 5s. to 6s. per gall. 90/180, 3s. to 4s. 6d. per gall. Heavy, 2s. 6d. to 3s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100 %.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—2s. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITHROBENZENE.—8½d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 10d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £10 5s. per ton. Good demand. Grey, £14 10s. to £15 per ton. Liquor, 9d. per gall.

CHARCOAL.—£6 to £9 per ton, according to grade and locality. Foreign competition severe.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10d. per gall.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 11d. to 4s. 3d. per gall. Solvent, 4s. 3d. per gall.

WOOD TAR.—£4 to £5 per ton.

BROWN SUGAR OF LEAD.—£40 15s. per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 5½d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 6d. to 2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £50 per ton, according to quantity. drums extra.

CHROMIUM OXIDE, GREEN.—1s. 1d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPHONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. to 6s. 3d. per lb.

ZINC SULPHUR.—1s. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 8d. per lb.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 10½d. to 1s. 11d. per lb. Less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.
ACID, SALICYLIC, B.P. PULV.—1s. 4½d. to 1s. 6d. per lb. Technical.—10½d. to 11¼d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—8s. to 8s. 3d. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. per lb.
BISMUTH CITRATE.—9s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 9d. per lb.
BISMUTH SUBNITRATE.—8s. 3d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.
BISMUTH OXIDE.—12s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts., 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 2s. 1d. to 2s. 3d. per lb.; potassium, 1s. 9½d. to 1s. 11d. per lb.; sodium, 2s. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3½d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. 0d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE.—£39 per ton, in barrels ex wharf.
GUAIACOL CARBONATE.—4s. 9d. to 5s. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE.—B.P., 2s. 6d. to 2s. 9d. per lb. Green, 2s. 9d. to 3s. 2d. per lb.; U.S.P., 2s. 7d. to 2s. 10d. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb., in 1 cwt. lots.
MENTHOL.—A.B.R. recrystallised B.P., 17s. per lb. net for January delivery; Synthetic, 9s. to 10s. per lb.; Synthetic detached crystals, 9s. to 12s. 6d. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, 7s. 6d. to 7s. 7d. per lb., levig., 7s. to 7s. 1d. per lb.; Corrosive Sublimate, Lump, 5s. 9d. to 5s. 10d. per lb., Powder, 5s. 2d. to 5s. 3d. per lb.; White Precipitate, Lump, 5s. 11d. to 6s. per lb., Powder, 6s. to 6s. 1d. per lb., Extra Fine, 6s. 1d. to 6s. 2d. per lb.; Calomel, 6s. 4d. to 6s. 5d. per lb.; Yellow Oxide, 6s. 10d. to 6s. 11d. per lb.; Persulph., B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 5s. 10d. to 5s. 11d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 5d. to 1s. 9d. per lb.
METHYL SULPHONAL.—9s. to 9s. 3d. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 1d. to 1s. 4d. per lb.
PHENACETIN.—2s. 6d. to 2s. 9d. per lb.
PHENAZONE.—4s. to 4s. 3d. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—98s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 4d. to 2s. 7d. per lb.; U.S.P., 2s. 3d. to 2s. 6d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s.8d.to 17s.2d.per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 4d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911—2s. 1d. to 2s. 4d. per lb., B.P.C. 1923—2s. 5d. to 2s. 6d. per lb. U.S.P., 2s. 4d. to 2s. 7d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 6½d. to 1s. 9d. per lb. Crystal, 1s. 7½d. to 1s. 10d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—6s. 9d. to 7s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 6d. to 9s. 9d. per lb., according to quantity. Firmer. Natural, 14s. 3d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—10s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.
COUMARIN.—9s. 9d. per lb.
CITRONELLOL.—13s. 6d. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—2s. 6d. per lb.
EUGENOL.—10s. 6d. per lb.
GERANIOL (PALMAROSA).—23s. per lb.
GERANIOL.—6s. 6d. to 11s. per lb.
HELIOTROPINE.—4s. 9d. per lb.
ISO EUGENOL.—14s. 6d. per lb.
LINALOL.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 10s. 6d. per lb
LINALYL ACETATE.—Ex Shui Oil, 14s. 6d. per lb. Ex Bois de Rose, 18s. 6d. per lb.
METHYL ANTHRANILATE.—8s. 6d. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—35s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 6d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. 6d. per lb.
RHODINOL.—38s. per lb.
SAFROL.—1s. 6d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN.—16s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—26s. per lb.
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR OIL.—9d. per lb.
CANANGA OIL, JAVA.—12s. 9d. per lb.
CINNAMON OIL LEAF.—6s. 9d. per oz.
CASSIA OIL, 80/85%.—8s. per lb.
CITRONELLA OIL.—Java, 2s. 1d. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 2d. per lb.
CLOVE OIL (PURE 90/92%).—6s. 9d. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—2s. 1d. per lb.
LAVENDER OIL.—Mont Blanc, 48/50%, Esters, 15s. 9d. per lb.
LEMON OIL.—13s. per lb.
LEMONGRASS OIL.—4s. 3d. per lb.
ORANGE OIL, SWEET.—30s. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 60s. per oz.
PALMA ROSA OIL.—13s. 9d. per lb.
PEPPERMINT OIL.—Wayne County, 14s. 6d. per lb.; Japanese, 7s. 3d. per lb.
PETITGRAIN.—7s. 3d. per lb. Sandalwood, Mysore, 26s. 6d. per lb., 90/95%, 16s. 6d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, July 12, 1928.

THERE is very little change to report in the market this week and trade continues quietly steady with few changes in price. Export trade has been somewhat brisker.

General Chemicals

ACETONE is unchanged in value at £65 to £67 per ton.

ACID ACETIC is unchanged.

ACID FORMIC has been in fair request at £47 per ton for 85% quality.

ACID LACTIC.—A fair business has been transacted on the basis of £43 per ton for the usual high class pale quality 50% by weight.

ACID OXALIC is active at £31 to £33 per ton according to quantity and position.

ACID TARTARIC is inclined to be somewhat quieter and price is quoted at 1s. 4d. to 1s. 4¼d. per lb.

AMMONIUM CHLORIDE is slightly easier, although the demand has improved, it is quoted at £19 per ton for fine crystals.

ALUMINA SULPHATE has been active and price well maintained at £6 to £6 10s. for 17/18% quality technically free from iron.

ARSENIC.—There is no change in this market to report and the price continues round about £19 per ton.

BARIUM CHLORIDE is again higher and is now quoted at £9 per ton, ex store, and works are well sold ahead.

COPPER SULPHATE.—Some small business has been placed on outside markets and there is no change in the price.

CREAM OF TARTAR continues nominally unchanged at £103, less 2½ % for 99/100% B.P. quality.

FORMALDEHYDE has been fairly active and price unchanged at £39 10s. for 40% by volume.

LEAD ACETATE.—Price well maintained here with a good demand for both grades at £42 10s. to £41 per ton respectively.

LEAD NITRATE is unchanged at £37 per ton.

LIME ACETATE is unchanged and in brisk request.

METHYL ACETONE.—A fair trade is passing at £56 to £58 per ton for 45% material.

POTASSIUM CARBONATE AND CAUSTIC is unchanged in price with a steady business passing.

POTASSIUM CHLORATE is active at £28 per ton.

POTASSIUM PERMANGANATE.—Good business is reported on the basis of 5¼d. per lb. for B.P. with commercial quality at halfpenny per lb. less.

POTASSIUM PRUSSIATE is unchanged in price at £63 10s. to £65 10s. according to quantity and position.

SODIUM ACETATE.—Demand has been brighter and price is very firm at £22 per ton.

SODIUM PHOSPHATE has been very active and the price is quoted at £13 per ton to £13 5s. per ton.

SODIUM PRUSSIATE is unchanged at 5d. per lb. with a good demand.

SODIUM SULPHIDE is unchanged.

TARTAR EMETIC has been a bright spot at 11½d. per lb. and makers now report they are well sold ahead.

ZINC SULPHATE has been active on the basis of £12 per ton.

Coal Tar Products

THE market for coal tar products remains quiet though steady, with little change in prices to report from last week.

MOTOR BENZOL is quoted at about 1s. 4d. per gallon, on rails.

SOLVENT NAPHTHA is quoted at 1s. 1½d. to 1s. 2d. per gallon, on rails.

HEAVY NAPHTHA remains at 1s. 1d. to 1s. 2d. per gallon, on rails.

CREOSOTE OIL is quoted at about 6½d. per gallon, on rails, in the North, for spot delivery, and at about 7d. per gallon in London.

CRESYLIC ACID is still weak, the 98/100% quality being quoted at about 2s. 6d. per gallon, f.o.b., and the dark quality, 95/97%, is quoted at about 1s. 10d. to 1s. 11d. per gallon.

NAPHTHALENES.—The 74/76 quality can be bought at £5 per ton, and the 76/78 quality at £6 to £6 10s. per ton.

PITCH.—There is no change in the position and business is quiet. The price is more or less nominal at 60s. to 65s., f.o.b., main U.K. port.

Latest Oil Prices

LONDON, July 11.—LINSEED OIL firm and 5s. to 7s. 6d. higher. Spot ex mill, £30; July, £28 12s. 6d.; August, £28 15s.; September-December, £29 5s.; and January-April, £29 10s., naked. RAPE OIL steady. Crude, extracted, £41; technical refined, £43, naked, ex wharf. COTTON OIL quiet. Egyptian, crude, £34 10s.; refined common edible, £40; and deodorised, £42 per ton naked. TURPENTINE quiet and 3d. to 6d. lower. American, spot, 44s. 6d.; August, 45s.; and September-December, 45s. 6d. per cwt.

HULL, July 11.—LINSEED OIL.—Spot and month, £28 17s. 6d.; August, £29; September-December, £29 5s.; January-April, £29 10s. COTTON OIL.—Bombay crude, £30 10s.; Egyptian crude, £33 15s.; edible refined, £37 5s.; technical £34 15s.; deodorised, £39 5s. PALM KERNEL OIL.—Crushed, naked, 5½ per cent., £37 15s. GROUNDNUT OIL.—Crushed-extracted, £39; deodorised, £43. SOYA OIL.—Extracted and crushed, £33; deodorised £36 10s. RAPE OIL.—Crude-extracted, £40 10s.; refined, £42 10s. per ton, net cash terms, ex mill.

Nitrogen Products

Export.—The announcement of export prices has been followed by a considerable number of inquiries for various positions, and large sales have already been reported on the Continent. It appears that there will be little difficulty in finding outlet for the increased production.

Home.—The home market continues dull, with only a few purchases being made for immediate delivery.

Nitrate of Soda.—There has been very good buying in European consuming markets, but asholders of stocks seem anxious to liquidate, prices have fallen as low as £9 3s. for prompt delivery. Considerable sales f.o.b. Chile have been reported at 16s. 4d. for July-August, 16s. 5d. for September-October, and 16s. 6d. for later shipment per metric quintal. Chilean producers have announced that no further sales will be made with a fall clause. The production tends to increase, and it is anticipated that this may rise steadily from 250,000 tons for June to 280,000 tons for later months.

Chemical Trade in June

THE Board of Trade returns published on Thursday, show that imports of chemicals, drugs, dyes and colours for the month of June were valued at £1,169,551, a decrease of £68,450 on June, 1927; exports were valued at £2,185,502 an increase of £198,477; re-exports were valued at £79,800, a decrease of £20,638. Detailed returns will be given next week.

South Wales By-Products

SOUTH WALES by-product business shows slightly more activity, but transactions generally are on an extremely moderate scale. There is little or no buying in pitch, but values are firm round about 57s. to 62s. per ton delivered. Creosote has weakened and there has been moderate business round about 6¾d. to 7¼d. per gallon. Solvent naphtha has a steady, though moderate, demand at from 1s. 1d. to 1s. 2d. per gallon, but heavy naphtha has little call at from 10½d. to 1s. 1d. per gallon. Refined tars have a sound call, and values are unchanged, coke oven tar changing hands at from 7¾d. to 8d. per gallon delivered in barrels, and gasworks tar at from 7½d. to 7¾d. per gallon delivered. Crude tar has a moderate demand round about 50s. per ton. Crude naphthalene has practically no call, but values remain steady round about 80s. per ton f.o.r., while whizzed has a moderate demand about 90s. per ton, f.o.r.

Manchester Chemical Manufacturer in Liquidation

THE statutory meeting of the creditors of James Eastwood and Sons, Ltd., chemical manufacturers, Manchester, in voluntary liquidation, was held on July 10, in Manchester. Mr. F. R. Vipond, the liquidator, submitted a statement of affairs which showed ranking liabilities of £8,413 5s. 8d., of which £6,568 17s. 9d. was due to the trade, and £1,844 7s. 11d. to the executors of the late Mr. W. H. Eastwood, in respect of cash advanced. In addition, there was a fully secured creditor for £150. After allowing £121 16s. 6d. for preferential claims, the total net assets were £3,612 8s. 7d., or a deficiency of £4,800 17s. 1d.

The liquidator reported that the company was registered in 1917 with a nominal capital of £10,000. During the year to January 31, 1925, there was a net profit of a small amount, but in the following 12 months, there was a net loss of £1,326. In the next year the net loss was £1,700, whilst for the year to January 31 last, there was a net loss of £3,643. During the period to June 19 of the present year, there was a net loss of £1,749. About two years ago the company started a patent which it was thought would help to recover lost trade. Although no money had been lost on the patent, the overhead charges had been increased.

It was decided to confirm the voluntary liquidation of the company, with Mr. Vipond as liquidator, with a committee.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinion.*

Glasgow, July 11, 1928.

THE Scottish heavy chemical market still remains quiet, this being no doubt due, to some extent, to the approaching holiday. Inquiry for export has been rather better.

Industrial Chemicals

ACETONE, B.G.S.—£64 to £67 per ton, ex store, according to quantity.

ACID ACETIC.—98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton; powder, £32 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Quoted 6½d. per lb. delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P.—Offered for spot delivery at 1s. 11d. per lb., less 3%, ex store. Quoted 1s. 10¾d. per lb., less 5%, ex wharf, to come forward.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality 4s. per carboy. Dearsenicated quality 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC.—80° quality, £24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer from the Continent at 3¼d. per lb., ex wharf. Spot material quoted 3½d. per lb., ex store. In better demand.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168° quality. Dearsenicated quality 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 4½d. per lb., less 5%, ex wharf, but this price could probably be shaded.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Quoted £5 5s. per ton, c.i.f. U.K. ports, prompt shipment. Spot material available at about £5 15s. per ton, ex store.

ALUM, LUMP POTASH.—Quoted £8 7s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent. Crystal meal quoted £8 10s. per ton, ex store.

AMMONIA, ANHYDROUS.—Quoted 9½d. per lb., crriage paid. Containers extra and returnable.

AMMONIA, CARBONATE.—Lump £37 per ton. Powdered, £39 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA, LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA, MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. port.

ARSENIC, WHITE POWDERED.—On offer for prompt despatch from mines at £19 per ton, ex wharf. Spot material quoted £20 per ton, ex store.

BARIUM CARBONATE, 98/100%.—English material on offer at £7 5s. per ton, ex store. Continental quoted £7 per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE.—Scarce for early delivery. Large white crystals now quoted £7 15s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers £6 12s. 6d. per ton, delivered, minimum four-ton lots. Continental on offer at £6 10s. per ton, ex wharf.

CALCIUM CHLORIDE.—British manufacturers' price £4 5s. to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports for export.

COPPER SULPHATE, 98/100%.—Offered from the Continent at £24 10s. per ton, c.i.f. U.K. ports. Some powdered material available at about £25 per ton, ex store.

FORMALDEHYDE, 40%.—Quoted £35 10s. per ton, c.i.f. U.K. ports. Spot material now on offer at £38 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material on offer at £31 per ton, ex store.

LEAD, WHITE.—£35 15s. to £37 per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White crystals now quoted £41 5s. per ton, ex store: brown on offer at about £40 per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. now quoted 1s. 4d. per gallon, less 2% delivered.

POTASSIUM BICHROMATE.—4½d. per lb. delivered, minimum 4-ton lots. Under 4-ton lots, ⅛d. per lb. extra.

POTASSIUM CARBONATE, 96/98%.—Quoted £25 10s. per ton, ex wharf, prompt shipment from the Continent. Spot material available at £26 10s. per ton, ex store.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £23 10s. per ton, c.i.f. U.K. ports; crystals, 30s. per ton extra; B.P. quality crystals or powder offered at £32 per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¾d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Unchanged at about 6¼d. per lb., ex store, spot delivery. Offered from the Continent at 6⅛d. per lb.

SODA CAUSTIC.—Powdered, 98/99%, £17 17s. 6d. per ton; solid, 76/77%, £14 10s. per ton, and 70/72%, £13 12s. 6d. per ton, minimum 4-ton lots, carriage paid on contract. Spot material, 10s. per ton extra.

SODIUM ACETATE.—Spot material on offer at about £22 per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3d. per lb., delivered buyers' works, minimum 4-ton lots. Under 4 and over 2-ton lots, 3 1/16d. per lb. Under 2-ton lots, 3¼d. per lb.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 3s. 9d. per ton, ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots.

SODIUM NITRATE.—Quoted £11 per ton, ex store.

SODIUM NITRITE, 100%.—Quoted £19 10s. per ton, ex store.

SODIUM PRUSSIATE.—In moderate demand. Spot material now quoted 4⅜d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton, delivered for unground quality. Ground quality, 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid, 60/62%, £9 per ton; broken, 60/62%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered. Buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material, 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 15s. per ton; rock, £10 12s. 6d. per ton; ground American, £9 5s. per ton, ex store. Prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports. Powdered, 20s. per ton extra.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf, prompt shipment from the Continent.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Benn Brothers Staff Outing

THE annual summer outing of the staff of Benn Brothers, Ltd., publishers of THE CHEMICAL AGE, took place on Saturday, June 30, when, at the invitation of Sir Ernest and Lady Benn, about two hundred and fifty of the editorial, advertising and publishing staff paid a visit to their country house at Oxted, Surrey. The journey to Oxted was made by motor coach, a stop being made at Brasted, where members of the staff Swimming Club gave a display in the swimming bath which was given to the village many years ago by Dr. Ludwig Mond; a further stop was made for lunch at Chart Woods. At Blunt House, Oxted, a cricket match and a tennis tournament were arranged in the afternoon, the evening being occupied in dancing. At the close a vote of thanks to Sir Ernest and Lady Benn was proposed by Mr. F. E. Hamer (THE CHEMICAL AGE) and was heartily seconded by all present.

Exemption of Vanadium-silica Compounds

THE Treasury have made an order under Section 10 (5) of the Finance Act, 1926, exempting vanadium-silica compounds specially prepared for use as catalysts for sulphuric acid manufacture from Key Industry duty from July 9 to December 31, 1928.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, July 12, 1928.

For the most part the movement of chemicals on this market during the past week has been on sluggish lines. Specifications against contracts are reported to be coming in fairly satisfactorily, considering the season of the year but new business, whether for home consumption or for shipment, has been patchy, with the majority of the orders for small lots. Generally speaking, values keep steady although several of the changes that have occurred compared with a week ago are in buyers' favour.

Heavy Chemicals

In chlorate of soda prices have varied little on the week, a moderate business being reported at from 2⅞d. to 3d. per lb. Prussiate of soda occupies quite a firm position at up to 5¼d. per lb., according to quantity, although there has been no very extensive inquiry for this material. Alkali keeps steady on the contract basis of £6 2s. 6d. per ton, and caustic soda at from £13 7s. 6d. to £15. 7s. 6d. per ton, according to quality, and in both cases a fair business is being done. Offers of saltcake are at round £2 12s. 6d. per ton, but the demand in this section is still on a rather subdued scale. Inquiry is s low in phosphate of soda and the tendency seems to be easy at round £12 per ton. Nitrite of soda is fully maintained at from £19 15s. per ton, a quietly steady business being put through. Offers of sulphide of sodium are on a slightly lower basis, the 60-65 per cent. concentrated being quoted at from £9 10s. to £10 per ton and the commercial grade at about £7 15s. Bichromate of soda meets with a moderate inquiry at about 3⅞d. per lb. Bicarbonate of soda keeps firm and is moving off in fair quantities at £10 10s. per ton. Bleaching powder is in quiet request but there has been little or no change in prices, offers being at about £7 per ton. There is a moderate inquiry for hyposulphite of soda, with the photographic quality at £15 10s. per ton and the commercial at £9 5s.

Carbonate of soda is a steady section at up to £25 5s. per ton and a quiet demand for this material has been reported. With regard to bichromate of potash a fair trade is being put through at from 4d. to 4¼d. per lb. The demand for permanganate of potash this week has been no better than of late but there has been little further change in prices, B.P. being offered at from 5d. to 5¼d. per lb., and commercial at 4¾d. Caustic potash keeps steady at from £33 5s. per ton for prompt delivery of one to five-ton lots, and a moderate inquiry for this material has been met with. Chlorate of potash keeps fairly steady at round 3d. per lb., but the demand for this has been rather slow during the past week. Yellow prussiate of potash is firm and meets with a moderate inquiry at 6¾d. to 7½d. per lb., according to quantity.

Buying interest in sulphate of copper appears to have slackened off somewhat, for shipment as well as for home use, and at about £26 per ton quotations are easy. Offers for arsenic are being made known to £16 15s. per ton at the mines for white powdered, Cornish makes, but only a moderate business in this section is being put through. Acetate of lime keeps firm on comparative scarcity of offers for near delivery dates, grey being quoted at up to £16 10s. per ton and brown at about £9 10s. As before, acetate of lead is quiet but prices are about unchanged, with white at £40 to £40 10s. per ton and brown at £39. Nitrate of lead is moving off in moderate quantities at about £37 per ton.

Acids and Tar Products

The demand for tartaric acid remains rather slow at 1s. 4d. to 1s. 4½d. per lb. Citric acid also continues inactive, with quotations still easy at 1s. 10½d. per lb. A quietly steady trade is passing in acetic acid, with glacial quoted at £66 to £67 per ton and 80 per cent. commercial at £36. Oxalic acid meets with some inquiry at round 3½d. per lb.

Comparatively dull conditions still rule in the by-products section. Pitch is exciting little interest on forward account, with offers nominal at rather less than £3 per ton, f.o.b. Solvent naphtha is fairly steady and in moderate inquiry at 1s. 1d. per gallon. Creosote oil is still quiet and on the easy side at about 6½d. per gallon. Similar conditions obtain in respect of carbolic acid, crystal offering at 6¼d. per lb. and crude at round 2s. 2d. per gallon for 60's quality.

British Glues and Chemicals

Favourable Outlook

The eighth ordinary general meeting of British Glues and Chemicals, Ltd., was held in London on Thursday, July 5, Mr. T. Walton presiding.

In his speech the chairman pointed out that as the capital reorganisation scheme received the sanction of the Court only on June 11, the accounts, made up to April 30, 1928, were on the old basis. Net profit for the eleven months was £51,286. The cash position showed a big improvement—a change from an overdraft of £30,000 to a credit of almost £50,000. The scheme of geographical rearrangement of factories was progressing well. Trading conditions generally had been better, and they were hopeful that the present level of markets would be maintained. He would speak of the future with caution because of the vicissitudes they have experienced, including slump, railway strikes, coal strikes, and the general strike; nevertheless, having regard to all the factors, he looked forward with some measure of confidence to even better fortune. They were pleased to be able to resume dividends on the preference shares, and, though the board's policy would be regulated with a view to assuring payment of those dividends, they were not without hope that before very long they might be able to make some return on their ordinary shares. The factory at Bermondsey, where rebuilding was progressing, would definitely tend to the relief of transport charges, with the advantage of the diminution of deterioration during transport. As ratepayers they expected to benefit under the rating proposals of the Chancellor of the Exchequer; but against this future gain they were having to bear the immediate and heavy burden of the new duty in respect of petrol and solvent spirit. The agricultural industry was still depressed, and prices of fertilisers had been slightly lower, but grease and glue prices had been higher. Competition at home and abroad was still energetic, but this friendly relationship continued and tended to mutual benefit. The report and accounts were unanimously adopted.

A New Benzol Distillation Co.

Lists were opened this week for an issue at par of 400,000 eight per cent. cumulative participating preferred ordinary shares of 10s. and the same number of 1s. deferred shares of British Benzol and Coal Distillation, Ltd., which is to instal a coal carbonization plant, a benzol rectification and a tar distillation plant, on a site to be leased to the company by the Bedwas Navigation Colliery Co. (1921), Ltd. The total capital is £250,000. The Bedwas Navigation Colliery Co. (1921), Ltd., has agreed to supply approximately 750 tons of coal per day at 11s. per ton at the colliery for fifteen years from the time the plant is completely installed and ready for operation, and also all electric power, steam, and water required for the working of the plant. It is stated that the plant contracted for is similar to plants already successfully operating and carbonising over 60,000 tons of coal per day in the United States of America and Europe. The total cost of providing, erecting, and installing the whole plant, including the distillation and rectification plants, will, it is estimated, not exceed £300,000, and arrangements are being made for the plant to be in full operation in 1929. The company, it is stated, will be in a position to manufacture upwards of 1,400,000 gallons of motor spirit and other oils per annum. The directors include Sir Arthur Duckham and Sir Samuel Instone, and Dr. R. Lessing is consulting chemist to the company. It is pointed out in the prospectus that the company will receive full benefit granted by the Budget.

The Boys' Ballot

Do you think you can say which is the most popular sport or pastime in this country? If you do, and you can place a short list of sports in correct order according to the popular vote, you may win one of a list of 350 prizes which are to be won in the Boys' Ballot organized by The East End Hostels' Association in aid of the John Benn Hostel and Milner Hall, Stepney. Send at once for particulars of this contest. Tickets are 1s. each, or 10s. for a book of 11, and may be obtained with full prize lists and posters from The Ballot Organiser, c/o Sir Ernest Benn, Bt., Bouverie House, Fleet Street, E.C.4.

Company News

COURTAULDS, LTD.—It is announced that an interim dividend on the £24,000,000 ordinary share capital of 1s. per share, free of income tax, will be paid on August 3 to shareholders on the books of the company at the close of business on July 5

ELECTROLYTIC ZINC CO. OF AUSTRALASIA.—At a meeting of the board of directors held in Melbourne on July 11 a dividend at the rate of 12 per cent. per annum for the six months ended June 30 last was declared on the whole of the issued shares in the company, due and payable at the registered office on September 6

BROKEN HILL PROPRIETARY BLOCK 14.—The director's report for the half-year ended March 31 states that the accounts show that the profit from working account was £10,215; add interest, £1,008, making £11,223. Administration expenses, insurance, rents, and depreciation of plant absorb £2,002, workmen's fund, £1,138, cessation expenses £7,724, and prospecting expenses £415, leaving a net loss for the half-year of £55, which, deducted from the credit of £45,428 brought in, leaves a credit to go forward of £45,372. Loss for the preceding half-year was £3,331, which reduced the credit brought in to £45,428.

BROUGHTON COPPER WORKS (1928).—Trading profit for the year ended March 31 last, after charging all trading expenses, including depreciation and directors' remuneration and fees, but before charging income tax and loan interest, amounted to £66,348, as against the prospectus estimate on the same basis of £69,696. Out of this sum of £66,348 there is due and has been paid to the vendor company £62,650 in accordance with the agreement for purchase. The company is a reconstruction of the Broughton Copper Co., Ltd., and is an amalgamation of that company and John Bibby, Sons and Co. (Garston), Ltd. The new company took over the business as from April 1, 1927, but is entitled only to the profits as from the date it was entitled to commence business.

MOND NICKEL CO.—For the year ended April 30, the report shows a balance to the credit of profit and loss account of £595,996. It is proposed to pay a final dividend of 4s. per share, making 5s. 6d. per share (27½ per cent.) for the year. After providing for dividend on preference shares at 7 per cent. per annum, placing £16,125 to debenture stock reserve account, £40,000 to reserve, the balance of £29,871 is carried forward. It is proposed to sub-divide the existing ordinary shares of £1 each into two ordinary shares of 10s. each, and to increase the capital from £4,900,000 to £5,500,000, by the creation of 1,200,000 new ordinary shares of 10s. each. Subject to the passing of the necessary resolutions, the directors intend forthwith to give to the ordinary shareholders the right to subscribe for 600,000 of the new shares, at a price to be fixed by the directors, reserving the right to issue the remainder of such new shares from time to time on such terms and conditions, and to such persons as they think fit. The proceeds of the issue of the proposed new capital are required in the first instance to meet the cost of opening up and equipping the Frood Mine, and of erecting additional smelting and refining plant. Any balance will be available for further increase of plant and as working capital for the general purposes of the company.

BRITISH OXYGEN CO., LTD.—The report for the year ended March 31 last states that after providing for the debenture interest and redemption, depreciation, and all standing charges, the balance is £128,000 as compared with £67,773 in the previous year. The directors recommend a final dividend of 6¼ per cent., subject to tax, making 10 per cent. for the year, leaving £50,488. This amount, together with the sum of £145,147 standing to the credit of profit and loss account, makes £195,635. During the year £42,500 has been paid on account of excess profits duty and income tax, leaving £153,135, which the directors consider will provide an adequate margin for contingencies and sufficient allowance for outstanding Government taxes. During the year no additional oxygen factories were erected, but additional plants for the production of oxygen and other gases have been manufactured at Edmonton works and installed in several of the existing factories. The engineering business at Edmonton is being satisfactorily maintained. Important Government and other contracts for oxygen plants have been successfully carried out during the year, and further contracts are in hand. Progress in subsidiary lines continues to be satisfactory, and Sparklet, Ltd., which is practically owned by the company, has again improved its position.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal" have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

SOUTH AFRICA.—The South African Railways and Harbours Administration invites tenders for the supply and delivery of red oxide paint in paste. Further particulars can be obtained on application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. (Reference No. B.X. 4558).

DRY COLOURS.—The Swedish State Railways are calling for tenders, to be presented in Stockholm by July 12, 1928, for the supply and delivery of dry colours. Further particulars can be obtained by firms desirous of offering material of British manufacture on application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. (Reference number B.X. 4557).

A Message from Mr. Parmelee

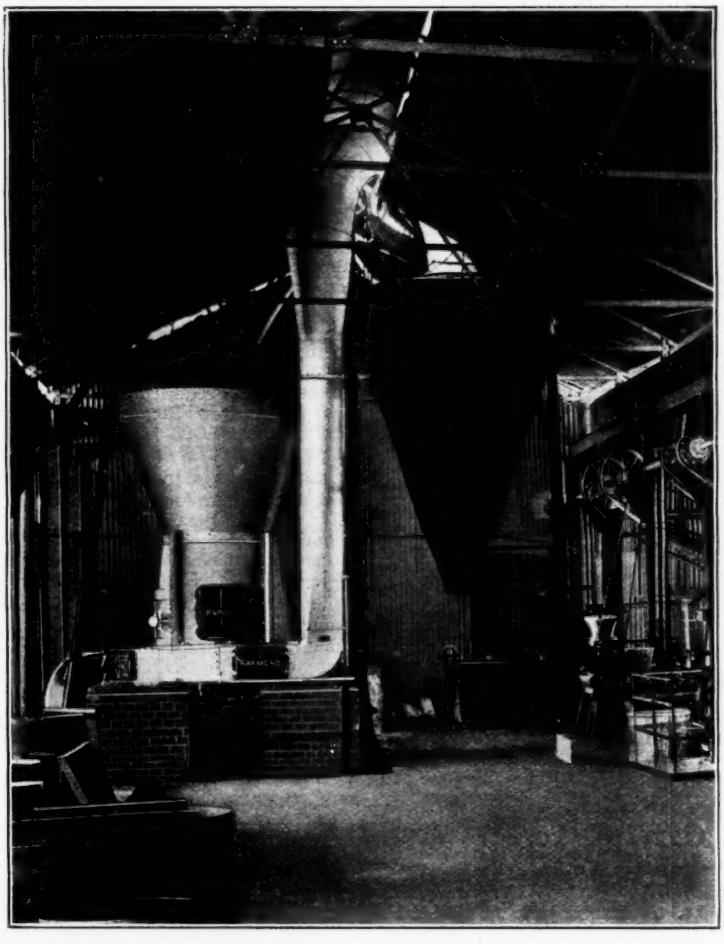
IN a message received this week from Mr. H. C. Parmelee, secretary of the American Institution of Chemical Engineers, who has just returned to New York after a visit to this country and the Continent, he refers to the "delightful recollections of our reception in England," on the part of Mrs. Parmelee and himself and states that he is looking forward to an early reunion in August with some of the good people he met on this side. In spite of the unexpectedly large size of the party who are leaving for Canada and the United States on August 11, the American chemical engineers, with the energetic assistance of the Raymond and Whitcomb Co., have been able to make arrangements for the care of all the tourists. An additional special train has been engaged for the "land cruise" and the necessary extra hotel accommodation secured at all the stopping places.

New York Decision on Ethyl Petrol

A DECISION has been made to allow the sale of ethyl petrol in New York, the only place in the United States where the sale of motor spirit containing lead tetraethyl has been prohibited. It is thought that the decision which was made by the Board of the Department of Health after investigations extending over a period of three years, will have an important bearing on the ethyl controversy in this country. The Board states that "Careful investigations by a group of eminent disinterested scientists, as well as the report from the State Commissioner of Health of New York, and the Surgeon-General of the United States Public Health Service, have failed to disclose any scientific evidence whatsoever indicating that the use of ethyl gasoline (petrol) as a motor fuel sold under such restrictions as are generally imposed, has produced any effects deleterious to life or health."

Institute of Metals Meeting in Germany

THE Council of the Institute of Metals has accepted an invitation from the Verein Deutsche Ingenieure and the Deutsche Gesellschaft für Metallkunde to hold next year's autumn meeting of the Institute in Germany. The meeting will take place in Düsseldorf. It is expected to prove attractive not only to British members but also to members resident in continental countries, who number many hundreds. The latter often find it difficult to attend meetings in the British Isles but—as was proved on the occasion of the Institute's gatherings held in Ghent and Liége—they come freely to meetings held on the continent. Düsseldorf is so readily accessible and so full of metallurgical interest that the meeting in that city—the first to be held in Germany by the Institute of Metals—is certain to be well attended and successful, supported as it will be by powerful German technical societies and by a large and enthusiastic German membership.



Finer Grinding at Lower Cost

Above photograph shows 3-Roller Raymond Mill recently installed in Paint Works in Calcutta. This mill is grinding BARYTES to 99·99% through 200 mesh and finer at the rate of 5 Tons per 8-hour day.

Previous Power Costs with Stone Mills were as high as 2s. 3d. per cwt.

This Raymond Mill has reduced Power Costs to 5½d. per cwt. also effecting much finer grade of product than ever obtained before.

INTERNATIONAL COMBUSTION LTD

GRINDING & PULVERIZING OFFICES
11, Southampton Row, London, W.C.1.

Telephone: Holborn 7277 8 Cable & Telegraphic Address: "Lopulco, Westcent, London"

WORKS — DERBY — ERITH.

Raymond Mills

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

CELLON (RICHMOND), LTD. (Surrey), manufacturers of dopes, varnishes, etc. (M., 14/7/28.) Registered July 2, £40,000 debentures; general charge. *——. December 31, 1926.

CONSOL PRODUCTS, LTD., Sunbury Common, essence manufacturers. (M., 14/7/28.) Registered May 18, £6,500 debentures by way of collateral security for mortgage dated November 25, 1927; general charge (subject to mortgage). *Nil. March 14, 1927.

STUART, ROY AND CO., LTD., Barlaston, chemical manufacturers. (M., 14/7/28.) Registered June 22, £800 (not ex.) mortgage, to Bank; charged on Rogers Piece, Meadow Farm, Clamgoose-Lane, Cheadle (Staffs). *Nil. January 28, 1927.

Satisfactions

NEW CANNAN'S, LTD., Bradford, soap manufacturers. (M.S., 14/7/28.) Satisfaction registered June 26, £500 registered March 13, 1912, and £500 registered October 4, 1915.

STEEL (J. M.) AND CO., LTD., London, W.C., chemical merchants. (M.S., 14/7/28.) Satisfaction registered June 29, £400 registered May 24, 1922.

WHITE (TIMOTHY) CO., LTD., Portsmouth, chemists. (M.S., 14/7/28.) Satisfaction registered June 28, £400,000 registered March 5, 1928.

London Gazette, &c.

Companies Winding Up Voluntarily

BITUMEN EMULSIONS, LTD. (C.W.U.V., 14/7/28.) By special resolution, June 11. Confirmed June 27. H. A. F. Ellinghouse appointed as liquidator. Meeting of creditors at 21, Cockspur Street, London, S.W.1, Wednesday, July 18, at 3.15 p.m.

SMITH BROS. (BRADFORD), LTD. (C.W.U.V., 14/7/28.) By reason of its liabilities. A. Greaves, Chartered Accountant, 35, Bank Street, Bradford, appointed as liquidator, July 4.

Bankruptcy Information

YATES, Robert, trading as ROBERT YATES AND CO., importers of heavy and fine chemicals, 96, Renfield Street, Glasgow. (S.B., 14/7/28.) Estates sequestrated June 12. The creditors will meet within the chambers of the trustee, James A. French, 175, St. Vincent Street, Glasgow, on Monday, July 23, 1928, at 12 noon.

New Companies Registered

BRITISH BEMBERG, LTD., 14, George Street, Mansion House, London, E.C.4. Registered as a "public" company on July 5. Nominal capital, £1,250,000 in 5s. shares. To adopt an agreement with J. P. Bemberg Actiengesellschaft (incorporated in Germany), to work, develop and turn to account the patents and licences, relating to the manufacture of artificial silk by the copper oxide ammonia process and other assets comprised in that agreement, and to carry on the business of manufacturers of and dealers in artificial silk, thread and other textiles, manufacturers of and dealers in acids, chemicals, dyes, wood pulp, cotton pulp, etc. Directors: Fritz Bluethgen, Elberfeld, Platzhoffstrasse 25, Germany; Ludolf Rosenheim, Carl Benrath, Wilhelm Springorum, Wilhelm Langenbruch, Gerrit Kreyenbrock, Alfred Schoenlicht.

DERBY CHEMICALS LTD. Registered July 4. Nominal capital, £500 in £1 shares. To acquire certain chemical formulæ for use in processes of laundry work, dyeing and cleaning, and other processes, and to carry on the business of general chemical manufacturers and dealers, dyers, cleaners and bleachers, etc. Directors: J. R. Farnsworth, Lumsdale, Matlock, and R. W. Barker.

DONCASTER COALITE, LTD., 3-4, Clements Inn, Strand, London, W.C.2. Registered as a "public" company on July 6. Nominal capital, £31,000 in £1 shares (30,000 7½ per cent. cumulative preference and 1,000 ordinary). To acquire interests in any invention relating to the carbonization of coal, and to carry on the business of drysalters, manufacturers, distillers and merchants of tar oil, benzol and other products, manufacturers, refiners, and dealers in all kinds of mineral and vegetable oil, etc. Low Temperature Carbonization, Ltd., are entitled to appoint, remove and re-appoint three directors, and S. Instone and Co., Ltd., have like rights in respect of two directors.

FREDERICK HARRIS, LTD.—Registered July 9. Nominal capital, £5,000 in £1 shares. To acquire the business of a chemical manufacturer and merchant now carried on by F. G. Harris, at 105, Hulme Hall Lane, Miles Platting, Manchester as "Frederick Harris." A director: F. G. Harris, 177, St. Andrews Road South, St. Annes-on-Sea.

H. E. HANSON, LTD., Queen's Dock Side, Hull.—Registered July 5. Nominal capital, £5,000 in £1 shares. Brokers of and dealers in tar, pitch, bitumen, coal, coke, carbonised coal and patent fuel of all kinds, petroleum, black or crude oils, tallows, greases, colours, dyes, dyestuffs, perfumes, chemicals, etc. Director:—H. E. Hanson, Willow Garth, Rolston, near Hornsea, East Yorks.

J. PATTISON AND CO. (GLASGOW), LTD., 203, Carntyne Road, Parkhead, Glasgow. Registered in Edinburgh on June 29. Nom. capital, £2,000 in 5s. shares. Chemical manufacturers and merchants, wholesale or retail general merchants, etc. Directors: J. Pattison, J. C. Blackater, and Mrs. A. M. Pattison.

New Capital for British Celanese

THE directors of British Celanese, Ltd., report that for the year ended February 29, 1928, there was a trading profit of £1,643,212, compared with £793,849 for the previous year. After certain deductions, including half a year's dividend on the 7½ per cent. cumulative preferential shares, there is £301,862 to be carried forward. Research expenditure was £32,696, against £6,127 for 1926-27, and in the same period the number of employees increased from 6,000 to over 13,000. It is proposed that the existing holders of 7½ per cent. preference shares should consent to the creation of 3,500,000 new 7½ per cent. cumulative first preference shares, to rank in front of them, the present 7½ per cent. preference shares becoming second preference shares, and their participation in profits over 7½ per cent. being restricted. In consideration of their agreeing to these conditions, plus the cancellation of the arrears of dividend, the preference shareholders are to receive 1,416,667 new fully-paid ordinary shares of 10s. each, and in addition it is proposed to create 500,000 ordinary shares of which 356,000 will be issued forthwith at £3 each.

Benn Brothers' Other Journals

THE CABINET MAKER.—Inside of a Mattress—XLIV; Furnishing Soft Goods; Up-to-date Furniture Finishes—III; Antique Exhibition at Olympia.

DISCOVERY.—Recent Excavations at Cyrene; Native Magic and Leprosy in Africa; "Some Problems of Crystal Growth," by Dr. C. Crossland; The New Cruise of the *Carnegie*.

THE ELECTRICIAN.—Special E.C.A. Conference Issue. Full Report of the Conference of the Electrical Contractors' Association, Cheltenham; "Bookkeeping for Contractors," by H. Moss; "How Does the Contractor Stand in 1928?" by D. Smeaton Munro.

THE FRUIT GROWER.—"Dust Spraying of Vegetable Crops," by Dr. Dye; Fruit Experiment Stations; English Strawberry Season.

GARDENING ILLUSTRATED.—New Primula Species; Kew Gardens in July; Hardy Lilies; Hedges: Modern Methods of Clipping.

THE GAS WORLD.—Conference of Public Lighting Engineers at Sheffield; Gas Refrigeration Campaign; The Use of Dutch Bog Ore in the Purification of Gas.

THE HARDWARE TRADE JOURNAL.—New Implements at the Royal Agricultural Show; Sheffield Exhibition of Workmanship: Quality Points in Cutlery and Tools; Merchandise Marks: Pump Manufacturers' Application.

THE TIMBER TRADES JOURNAL.—The British Standard; Forests of Scotland; Forestry and Woodcutting Machinery at the Royal Show; Setting up a Saw Mill.